The Chemical Age

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Notes and Comments

Business in Difficult Times

THE past year or two has been the most difficult time for business within living memory. How have the directors of great industrial concerns reacted to the situation? "An international effort," we read, "has recently be started to expand the use of, and so to create business for, tin." This is financed by a levy which the leading tin-producing countries have mutually agreed to impose on the export of the metal. An organisation has been built up in which scientific, technical and statistical information is systematically acquired on all the present and potential uses of tin. Researches and lines of development are being planned and investigations allocated to laboratories of suitable institutions. Close contacts are being maintained between the laboratories of all countries. The institutions so far selected comprise seven British Universities, the National Physical Laboratory, the Research Department at Woolwich, and the British Non-Ferrous metals Research Association. It is a tribute to the scientific standard of this country that all the research work has been started here, and the statistical work alone is being done abroad—in Holland.

So much for an association of producers. Now for the individual business. A similar note is struck by that vast concern, the General Electric Company. Sir Hugo Hirst refers to the fact that the company is this year £44,000 behind the previous year in net profit, and that since the electrical grid is completed still less work in established lines is to be expected. He goes on with cheery courage, "Our scientists and engineers are now busy on the task of finding new work to take the place of the old. I am confident that they will find it, but it may be of such a nature that our present layout and equipment may not be adapted to meet it; new machines and tools may have to be evolved. . . such matters do not discourage us but are rather treated as a spur to fresh endeavour."

Facing the Future with Boldness

THE Dunlop Rubber Company is another instance which may be taken at random; here a somewhat different, but none the less valuable, note is struck. The difficulties have been met by "a policy of concentrating operations in a smaller number of units, which can thus work up to a higher pitch of efficiency." Improved manufacturing methods have been introduced, says Sir Eric Geddes; "Our selling organisation throughout the world has been overhauled and is still being overhauled." Let the chemical industry mark that! There has been no wages reduction, and (perhaps as the result) "the personnel everywhere has responded to the call for greater effort and efficiency in the most wonderful manner; there has been real team spirit. . . The research, development and testing laboratories, in co-operation with manufacture and sales, have kept pace with new trends." Reductions of cost in the rubber fields have also been made by scientific development work so that the crops to come will average three times per acre what was obtained in past years and the cost will be reduced by one penny a pound on a former figure of $2\frac{3}{4}$d.

British business men, British workers and British capitalists are facing the future with boldness; sowing so that they may reap; confident in their own powers. That is a great lesson for all to learn, whether they be in charge of great business or whether they be the humblest shunter who depends upon the flow of goods for his daily bread. Those who return from abroad frequently relate the opinion of the foreigner that, of the nations, Britain will be the first to arise from the slough of despond in which all now wallow. The way in which the depression is being tackled here is definite evidence that their good opinion is not misplaced. The rising tide of employment, whilst it may prove illusory if other nations do not also tackle their troubles boldly, is at least evidence of a highly satisfying character that we are upon the right lines.

Works Fatalities

THE National Safety First Association continues to do good work in publishing an account of recent prosecutions regarding non-compliance with safety regulations. In the August issue of the "Industrial Safety Bulletin" there are seven such cases reported. The subjects are varied, but are of immense industrial interest. In one case a firm has been fined £2 for failing to fence a hoist and £1, on a second summons, for failing to provide a first-aid box as required by the Factory and Workshops Act. With regard to the first-aid box, it was pointed out in defence that the contents did not comply with the Act at the time of the inspector's visit because some of the items had been used on that particular morning. In another case, it was failure to fence the flywheel of an oil engine, and failure to provide the necessary fencing on part of the machinery carrying a countershaft; the latter was only three feet from the floor level and could be reached by anyone, so that it definitely constituted a danger. There is, however, some degree of inconsistency in the fines imposed by the different Benches. On summons arose out of a fatal accident to a man who attended to machinery on which the projecting end of the mainshaft of a Diesel engine was unfenced, as was also a pulley and belt driving a dynamo from this same

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shaft. On the day of the accident the deceased was repairing the dynamo pulley. When the work was completed, trouble arose whilst adjusting the belting upon the driving pulley, and as the shaft was running he became entangled in the belting and was killed. The fine imposed was £20. Alongside this, there is an account of another fatality caused by the use of an electric lampholder, which, according to the evidence of the factory inspector, was definitely not of the safe, insulated type, and therefore not in accordance with the regulations. This was one charge; a second charge concerned an equally important factor contributing to the accident, for the switch of the light was in the earth circuit. Here the fine imposed was only £2, with costs. In both cases a man was killed by negligence on the part of someone, presumably the employer, but different Benches seem to have different opinions upon the adequacy of the fine imposed. A fine of £2 is not so hard to bear as one of £20, and the "cheapness" of unsafe lampholders might still be an inducement for the employer to take risks. Such lampholders are not so readily detected as is unfenced machinery, so far as the visit of the factory inspector is concerned.

Recruitment in Industry

AN industry, like an army, depends for success in no small measure upon the quality of its recruits. The annual report of the Employment Department of the Ministry of Labour in the South-Western Division makes interesting reading on this account. Hitherto youths have been placed principally in the commercial occupations. In the 1929-1931 period the placings were 36 per cent. commercial and 23 per cent. technical; in 1932 these figures were reversed being 26.4 per cent. commercial and 34.7 per cent. technical. These youths —of whom more than ever were placed—have been vocationally trained, and in many instances were drawn from public schools. Mechanisation in offices has opened more careers to girls replacing men but has resulted in commercial occupations decreasing. But for mechanisation the "big five" banks could have absorbed between 4,000 and 5,000 recruits during the last two or three years. The Ministry states: "There is every reason to anticipate a continuance of the process for some time to come." In these days the continued replacement of men by the machine is a cause for grave concern; but our concern is tempered by a feeling that it is all for the best if our young men are turning to men's occupations and if the "black coat" of the Victorian and Edwardian days—that symbol of middle-class poverty-stricken respectability—is to disappear. There are few occupations which tend to sap initiative more than routine office work. Too often the elderly clerk is a painful spectacle of human wormhood. The whole range of British industry may congratulate itself that youth is once again taking off its coat to work and is not particular whether the job be dirty or clean. It is an old Yorkshire saying: "Where there's muck there's money."

Where to Look for Recruits

THE employment statistics this year appear to show that more men will be required to staff industrial concerns; where can they best be found? There is clearly a distinction to be made between those required for the technical staff and those needed on the business side. The technical staff will always contain a proportion of highly trained—and therefore presumably highly-paid—men, together with a greater or smaller number of routine men who have little training when they are engaged but who, if they are of any use, learn while they work themselves up. The technical man is chosen in relationship to the work he has to do.

It is less easy to choose the business man upon those lines. Since the technical man, like the business man, must to-day be regarded as a future leader of industry something of the same difficulty may arise when choosing between two technical men of approximately equal technical merit. It is the old controversy: Are university men the best for industry, or should the office boy who had worked his way up be preferred? This question was discussed by the Institute of Chartered Secretaries recently, when the Warden of New College (Mr. H. A. L. Fisher) agreed that no university education could give to a man "that wonderful flair for buying and selling that is the foundation of the success of so many great businesses." Business, however, has changed in character. The old one-man businesses depended for their success upon that very flair; experience shows that the highly educated man rarely succeeded; but there have been many instances during our time of men without education, nearly without schooling, who have amassed comparative fortunes. The ability to do business pleasantly, leaving behind the satisfied customer who returns, is of fundamental importance alike in the retail store, in the wholesale market and in international trading; this ability is equally important whatever is sold. Mental training and the power to mix gracefully with men from every class of society are highly important. In business to-day every man must be judged by what he can do and not by what he has done whilst at school and university.

Research

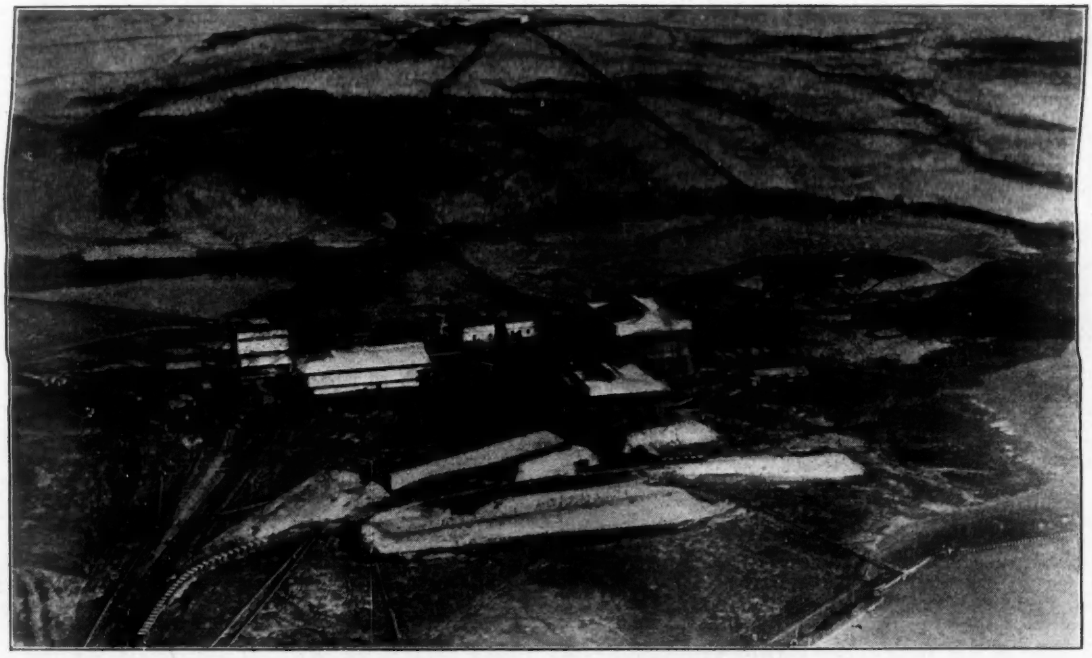
RESEARCH is the job of prying into the unknown areas which surround a business. It may seek for means of making progress in the manufacturing aspect, or for new channels in which manufactures may be sold profitably. A few years back the directors of many industrial concerns knew very little about it; to-day the number of these short-sighted fellows is decreasing, but they still have much to learn. Jones, whose works are across the canal, suddenly stepped ahead of Brown and cut his production costs by 20 per cent. and ultimately gathered many new customers in a market which was thought to be of little consequence. Both of them carried on research, but their methods were widely different. Jones spent his money wisely; neither lavishly or stintingly. He also surveyed the field and mapped out a programme. When he was caught by the trade depression he intensified his research, fully convinced that progress would be made for the welfare of his firm and its profits. Brown, on the other hand, pursued no definite scheme, and he regarded his research department somewhat in the light of a luxury which could be indulged in during prosperous times. Under the depression he reduced research expenditure by 30 per cent. or more, but to-day he is a wiser fellow. Across the canal he can see the activities at his rival's works and he knows that Jones still forges ahead with sales—and with research.

The Dead Sea Salts Industry

Progress at the Works of Palestine Potash, Ltd.

THAT considerable progress is being made in the exploitation of the mineral salts present in the waters of the Dead Sea, Palestine, is evident, from the accompanying aerial photograph showing the works of Palestine Potash, Ltd. The company was formed in October, 1929, and the Dead Sea Salts Concession was granted to them in January, 1930.

According to a recent issue of "The Near East and India," from which this photograph is reproduced, it was in 1840 that the British Admiralty sent an expedition to the Dead Sea. Molineux organised one in 1847; the American Government, another in 1848. In 1908 the well-known geologist, Dr. M. Blankenhorn, undertook a scientific exploration under the auspices of Sultan Abdul Hamid II. All these expeditions had a purely scientific purpose and supplied either evidence for a variety of theories concerning the probable origin of the Dead Sea, or furnished copious information as to its pecularities. No serious attempt was made to examine the possibilities of a commercial exploitation of the mineral wealth of the Dead Sea until 1911, when Mr. M. A. Novomeysky, the present managing director of Palestine Potash, Ltd., started his preliminary surveys and preparatory work. In the spring of 1921 he resumed this work on the shores of the Dead Sea. Detailed surveys and soundings were made, and systematic experiments were conducted on a more comprehensive scale. This pioneering period lasted until January 1, 1930, when the concession for the exploitation of the minerals contained in the Dead Sea was granted jointly to Mr. Novomeysky and Major T. G. Tulloch, who, during the Great War, had become interested in the possibility of extracting potash from these water.



The Works of Palestine Potash, Ltd., showing Pipe-lines and Salt Pans.

Experiments in Solar Evaporation

The experiments made by Mr. Novomeysky proved that the salts of the Dead Sea were capable of being precipitated by solar evaporation and, subsequently, of being easily separated from one another. From small beginnings the scope of the undertaking has been gradually extended, and experience has enabled continual improvements to be made in the plant and in the methods employed. The first year, 1930, saw a few thousand tons of crude potash salts produced, all of which were harvested by a new mechanical method. The experimental power house of 1930 was supplemented the following year by a new one, equipped with large Diesel-type motors with high-tension alternators, and an underground transmission line of a total length of two and a half miles provided the pumps and various machinery spread over the concession area with electric current. The erection of the first small bromine plant was completed in February, 1931, and the first consignment of bromine for the English market was dispatched by the end of the same month.

The high content of bromine in the final liquor produced from Dead Sea water is several times that of the brines in other parts of the world, and the small plant was able to produce more than a ton of refined bromine daily. The potash factory was sufficiently advanced by the end of 1931 to enable a few hundred tons of high-grade potash to be placed on the British market in December of that year, and early in 1932 the factory was in full working order. The quality of both products proved to be highly satisfactory, and the company was able to dispose of the whole of its output on the world's markets.

The water for feeding the evaporation pans was taken at first from the surface of the Dead Sea. Soundings made over a period of several years proved that at a certain depth brine was to be found of high specific-gravity and increased content of potash and bromine. In 1931 a point at the bottom of the sea, 175 ft. deep, was located at which the content of potash and bromine reaches its maximum—50 per cent. more than that of the surface water. A permanent pipe-line, 2,500 ft. in length, was accordingly laid on the bottom of the sea to reach this point, and a new station capable of pumping 8,000 gal. of heavy brine a minute was erected.

The products of the company are at present transported from the Dead Sea to Jerusalem by lorries, and from there by rail to Haifa or Port Said. An asphalted branch road, five and a half miles long, connecting the existing Jerusalem-Jericho road with the Dead Sea was completed in September, 1931, thereby reducing the time taken by the journey of about 25 miles to railhead at Jerusalem and affording adequate transport facilities for the company's present requirements. With the co-operation of the Palestine railway authorities, freightage has been agreed for the transport of the company's goods, and arrangements have been made under which those goods reach expeditiously the Palestine ports of Jaffa and Haifa, and Port Said.

Accidents in Factories and Workshops

Annual Report of the Chief Inspector

ACCORDING to the annual report of the Chief Inspector of Factories and Workshops for the year 1932 (H.M. Stationery Office, price 2s. net), there were 157,891 factories and 90,859 workshops on the registers of the Department, being an increase of 2,537 factories and a decrease of 4,855 workshops, as compared with 1931. Complaints received during the year numbered 3,916, of which 667 dealt with matters outside the inspectors' jurisdiction; of the remaining 2,203, nearly 78 per cent. were substantiated on inquiry. Genuine complaints afford very useful information to inspectors in enabling them to detect and rectify irregularities; the source of a complaint, or even the fact that a complaint has been made, is never disclosed to the occupier concerned.

During the year the Department of Scientific and Industrial Research arranged for research to be conducted by the Chemical Defence Research Department of the War Office on "breathing apparatus," intended for protective use in dusty and toxic atmospheres, in particular on the design of dust respirator for securing maximum efficiency and comfort, and on the range of toxic substances against which so-called canister respirators (*i.e.*, those provided with absorbent material) may be accepted as protective. Simultaneously with the latter investigation the best methods of detecting and estimating traces of toxic substances in the atmosphere are being studied. A contribution to the cost of these investigations is being made by the Association of British Chemical Manufacturers.

Fatal Accidents

The total number of accidents reported again shows a decrease from 113,249 to 106,164, and the fatalities from 755 to 602. Continued depression in the industries, particularly in those which are usually responsible for the largest numbers of accidents, is probably the main cause for this reduction, but there is clear indication in the reports received that the growth of the Safety First movement is also having its effect in reducing accidents in many works where safety organisations have been established and are maintaining a keen active interest in the work of accident prevention. Buildings under construction again show the greatest number of fatalities for one industry although the number reported has fallen from 103 to 95. The metal industry (smelting, conversion, rolling, founding, etc.) is next on the list of fatalities with 72 fatalities, followed by docks with 68, and chemicals with 30. Of the total accidents reported, more than half (66,103, including 323 fatalities) were due to the use of hand tools, persons struck by a falling body, persons falling from a height, persons stepping on or striking against objects, and persons handling goods or articles. The "human element" is an important factor in the cause of many of these accidents and much attention is being given at present to such accidents by works safety committees with a view to reducing their number.

Dust Explosions

Dust explosions occurred in two plants (belonging to the same firm) in which oil cake and various seeds were being ground. Both plants are very similar in design, the raw materials being subjected to a preliminary breaking process in a disintegrator, and then carried by bucket elevator to a screening machine and afterwards to a second disintegrator for further grinding. In the first accident four men, and in the second case two men, were burned. There was little damage to the plant in either case and this was no doubt due to the relief afforded by explosion panels on the elevator casings and on the disintegrator hoppers.

Two explosions also occurred in the cork grinding plant at a linoleum factory. Some time before these accidents, the ground material from the mills had been carried to a dressing machine and bag filters (on an upper floor) by means of a worm conveyor. Unfortunately the firm replaced this system and arranged for the ground material to be blown to the upper floor by fan draught with the result that, when ignition occurred in one of the mills, the dust cloud in the fan duct was ignited and the explosion passed to the cyclone and bag filters on the floor above. The dust of the filter bags was blown into a cloud in the room after the first explosion and the ignition of this cloud produced a secondary explosion which caused further damage. The firm were advised to replace the pneumatic system of carrying the ground material either by an elevator or worm conveyor, to provide a choke between the grinding mills and the elevator and explosion vents both on the elevator and on the mill casings, and to earth all parts of the plant.

Water Gas Plant Explosions

Two explosions occurred on water gas plant during the gas-making period while steam was being injected, and were due to gas leaking back past a double-disc sluice valve, forming an explosive mixture in the blast main which was ignited when the blast was once more applied. It has therefore been recommended that air pressure in excess of that prevailing in the generator during the steaming period should be maintained in the blast main when the blast valves are closed, to prevent back leakage of gas into the main; that a relief pipe should be fitted between the discs on the blast valve with a small valve interlocked with the main valve in such a manner that it is open only when the main valve is closed, any escape of gas past the main valve then being easily observed; and that relief or explosion discs should be provided on the blast main in case the relief pipe becomes choked. In some cases canvas panels are provided for this purpose, but the use of sheet lead 0.0075 in. thick supported between two pieces of 1 in. square mesh wire netting has been suggested. It is necessary to place explosion vents in such position that an attendant will not be injured if and when they come into action. Relief discs should also be provided on the blowers.

Danger from Iron Sulphide

Following the distillation of a charge of light oil in a still of about 4,000 gallons capacity, an explosion occurred which bulged the domed bottom of the still and damaged the brickwork setting and pipe connections. After distillation was complete the fire was drawn and about 16 hours later a 1 in. air tap on the top of the still was opened and the residue consisting of light creosote was run out; the explosion occurred about 6 hours later. At the time of the explosion and for the preceding six hours everything on the still was closed except the 1 in. air tap; the probable explanation of the explosion is that a coating of iron sulphide on the inside of the still became incandescent owing to the oxidising action of the air and ignited the air-vapour mixture in the still. Mr. W. A. Damon, Chief Inspector under the Alkali Acts, has pointed out that in some tar distilleries it is usual to paint the interior surface of the stills with cement slurry to prevent corrosion, and this may also prevent the formation of iron sulphide.

An accident from the same cause, which fortunately caused only structural damage, occurred in a plant used for vulcanising rubber by the action of sulphur dioxide and sulphuretted hydrogen gases. The ignition took place inside the treatment chamber at a time when the sulphuretted hydrogen was being replaced by air. Samples of incrustation collected from the air inlet showed, on analysis, presence of iron sulphate and sulphide. It is probable that the ignition was due to the passage of the air oxidising this deposit of iron sulphide and causing it to become incandescent. To prevent injury to workers should a similar explosion occur again the chamber is being fitted with an explosion panel suitably placed and the air intake pipe is to be provided with a flame arrester as an additional precaution.

Use of Cellulose Solutions

A feature of the increase in the use of these solutions has been the desire of most occupiers to comply with the recommended safe practices, and much preliminary advice has been given to firms before beginning processes. Attempts have been made to substitute synthetic resin paints for cellulose solutions in some classes of work. This may be an important phase in the near future, and the subject of toxic

or fire dangers involved, if any, in their use is not being lost sight of.

During the year 13 cases of fires associated with the use of cellulose solutions came to notice. Although no serious bodily injury resulted from any of these fires, there was considerable material damage in some, and it will be appreciated that any of the outbreaks might have had most serious effects if not noticed in time. The highly dangerous nature of the residues resulting from cellulose spraying is again borne out as in previous years, and points to the real necessity for frequent cleaning of all surfaces on which these residues accumulate. It is still apparently not appreciated that these residues are apt to inflame at comparatively low temperatures due to the heat of a steam pipe, a heated bearing, or a frictional spark. Regulations to deal with the dangers incidental to the manufacture and use of cellulose solutions have been drafted and these, when established, will no doubt tend to secure satisfactory conditions generally.

Chromium Plating

The most troublesome matter in regard to securing compliance with chromium plating regulations was the provision of efficient exhaust ventilation. Happily this difficulty has been successfully dealt with. No trouble is experienced with new plant as the baths are made to standard design by well-known makers and have very efficient exhaust plant fitted to them. Tests made during the year suggest that the average minimum velocity of the air over the entire area of the bath should not be less than 100 feet per minute to give the best results, and that the electrolyte should be kept, if possible, at a level at least nine inches below the exhaust slot opening. The dangers of the work are now so well known and appreciated that in the larger works improved methods of working are being devised and adopted in order to lessen the risks involved. The reports show that a high standard of compliance with the regulations has now been secured.

Industrial Diseases

One hundred and thirty-one cases with 44 deaths were reported from epitheliomatous ulceration of the skin; 33 with one death from pitch; 37 with 18 deaths from tar; one from paraffin; 60 with 25 deaths from oil. Of these 60 cases from oil, 57 occurred among cotton mule spinners. The occurrence during the past 11 years of 10 cases (9 fatal) of cancer of the interior of the nose amongst workers at the works of a nickel refining company was brought to the notice of the Department. At visits to the works nothing was disclosed to indicate any known cause to account for these cases, but the firm asked Mr. Robinson, aural surgeon to the Swansea General Hospital, to undertake a complete examination of a group of workers. His examination did not reveal any further case or any condition which would indicate a causative agent, but the examination of all the workers is now being undertaken by the works surgeon. Until this examination is complete the question of industrial responsibility must remain an open one, though the very high incidence of cancer in a little recorded site cannot be regarded otherwise than as suggestive.

A slight increase in the number of tabulated cases of chrome ulceration is largely to be ascribed to the notification of cases by certifying surgeons or appointed surgeons who carry out the periodic medical examinations. Many of these cases do not involve absence from work. Aniline poisoning shows a decrease due mainly to improved conditions in the works from which a number of cases occurred in 1931.

Gassing Accidents

The number of gassing accidents reported was 125, of which 11 proved fatal. The nature of these accidents and their cause differ little from those in previous years. Among the rarer forms, ethylene dichloride, ethylene chlorhydrin and hydrogen iodide were each responsible for one case.

Special attention has been directed by the medical inspectors to the effects of trichlorethylene. This chemical has recently come into very extended use following the introduction of many different kinds of plant for cleaning clothes, and for degreasing. A few cases of partial anaesthesia, not necessarily reportable as accidents, have been met with. These accidents occurred under abnormal circumstances, the usual being cleaning out the sump without the fan running, or entering the apparatus for cleaning without protection. In no instance has any sign of chronic intoxication been observed. This is important, as on the Continent a number of symptoms, very varied in character, have been stated to result from continued exposure to trichlorethylene. One can only conclude that the conditions of work as regards ventilation compared indifferently with those found in this country. One of the cases of toxic jaundice included in the notified cases concerns a lad who was using this material as a degreasing agent. Although the conditions of his employment were not entirely satisfactory, two other lads similarly employed were not affected. The similar use of carbon tetrachloride as a cleaning agent used in enclosed machines, much in the same way as trichlorethylene, has also been closely watched. The use of tetrachlorethane, which is now happily very limited, has been kept under close observation.

Special mention must be made of two cases of toxic jaundice from arseniuretted hydrogen evolved from wetting dross containing aluminium arsenide. Cases of a similar character have been recorded in previous reports and are of importance because of the unsuspected evolution of arseniuretted hydrogen.

Production of Oil from Coal

Schemes Discussed in South Wales

AN important memorandum on hydrogenation and low temperature carbonisation by Dr. R. Illingworth was a feature of a conference of the South Wales Industrial Development Council at Cardiff last week.

The conference, over which Councillor George Williams presided, attracted a number of Wales' leading industrialists, and Dr. Illingworth, in his remarks, pointed out that Britain, being devoid of natural oil supplies, had to look for substitute sources based on coal as a raw material. They had to have (1) light hydrocarbons; (2) fuel oils; (3) Diesel and semi-Diesel oils; and (4) lubricants and grease. Hydrogenation was, by virtue of economic fact, confined solely to the production of light hydrocarbons because, with the exception of lubricants, the other liquid products demanded by industries were at prices much below the minimum cost of hydrogenation. There was every possibility that in a few years time petrol would be largely replaced by Diesel oil for, at least, heavy road transport. That oil did not come under the Government scheme. Concentration on petrol production assumed that engineering progress would stand still. It was quite possible that in the near future big quantities of Diesel type oil would be demanded in place of petrol, and it was conceivable that the hydrogenation processes would ultimately improve production costs to meet the Diesel demand, but that would mean a decrease in revenue.

Details of Capitalisation

It was stated that the total capital sum incurred for initial hydrogenation plant would amount to £4,500,000. This plant would treat 330,000 tons of coal per annum and produce 100,000 tons of petrol. The scheme would furnish permanent employment for 1,000 miners and 1,500 process workers, and temporary work for from 7,000 to 12,000 men for 18 months on constructional work. From this the following capitalisation arose:—Capital per ton of petrol produced per annum £45; capital to place in permanent employment the miner, £4,500; the process worker, £3,000; one worker of either type, £1,800; while the capital to give temporary employment per man per year was £225. The value of import price of products at £3 17s. 6d. per ton, £375,000, and the capital cost to retain £1 trade balance at home £12.

Referring to carbonisation, Dr. Illingworth said that on the basis of 4,500,000 tons of coal treated per annum, carbonisation gave fuel 72 per cent. (3,240,000 tons); oils 7 per cent. (315,000 tons); petrol 1.1 per cent. (50,000 tons); pitch 2 per cent. (90,000 tons); total gas 10 per cent.; surplus gas 2½ per cent. The difference of fuel for sale and the coal carbonised showed that 1,260,000 tons of coal were removed from the market and were saleable as petrol, oil, or gas. An expenditure of £4,500,000 on carbonisation would, it was estimated, create permanent employment for 5,000 miners; 1,800 permanent process workers, and 25,000 temporary constructional workers for one year.

After discussion it was decided that a detailed plan should be drawn up by Dr. Illingworth, Professor George Knox, and Mr. H. H. Merrett for later consideration by the Council.

Financial Position in the Chemical Industry

By S. HOWARD WITHEY, F.C.I.

DESPITE fluctuations of exchange rates, and the difficulties which have been experienced in transacting business through foreign branches, manufacturing chemists are able to report improved results, and in some instances the margin of net profit has enabled the rate of ordinary dividend to be raised. The audited accounts of W. J. Bush and Co., Ltd., covering the twelve months to the end of December last, disclosed a net profit of £58,970, which figure was arrived at after debiting debenture interest and depreciation, and compared favourably with £32,182 realised during the preceding twelve months. With £81,874 brought in from the 1931 account, there was a disposable balance of £140,844, of which the dividend on the company £125,000 of 5 per cent. cumulative preference shares takes £6,250, and the dividend of 9 per cent. on the £250,000 of ordinary shares £22,500, leaving a credit balance of £111,512 to be carried forward to the next account as against £81,874 brought in. The company's balance sheet showed a small increase in the amount owing to sundry creditors and trade suppliers from £115,729 to £125,063, but this amount is well covered by book debts and stocks, the former totalling £113,448 and the latter £287,537. The preference shares are of £5 denomination.

During the financial year ended March 31, a profit of £5,464 was realised by British Alkaloids, Ltd., which compares favourably with the profit of £2,509 shown in the 1931-32 account. This company was registered in 1928, and of an authorised share capital of £150,000, the sum of £77,604 has been paid up, comprising £30,829 in the form of 8 per cent. participating preference £1 shares, and £46,775 in ordinary shares of 1s. each. After meeting a full year's fixed preference dividend, and allocating £500 to taxation reserve, the sum of £300 was written off preliminary expenses, and £2,490 off advertising account, leaving a credit of £733 to go forward as against £408 brought in. During the same period a satisfactory increase of profit was realised by A. Boake, Roberts and Co., Ltd., the figure of £70,542 comparing with £52,257 shown in the 1931-32 account. This enabled a final dividend of 1½ per cent. to be declared on the company's ordinary shares, making 8½ per cent. for the year, tax free as compared with 7 per cent. distributed the previous year, and the sum of £8,475 to be transferred to reserve, raising that fund to £140,000, and after allocating £9,021 to taxation; £7,727 to employees; £2,500 towards debenture redemption; and £70 to the staff benevolent fund, there remains a balance of £53,157 to be carried forward to 1933-34 as against £37,441 brought in from 1931-32.

Bleaching and Dyeing

Less satisfactory results have been reported by bleachers, dyers, colour and calico printers, although some firms under this heading have secured a greater balance of profit, or reduced the deficit, as the case may be. The net profit of £107,173 realised by Bleachers' Association, Ltd., during the twelve months to the end of March last, compares with £112,634 disclosed in the previous account, and after adding the sum of £213,000 brought forward from 1931-32, there was a disposable balance of £320173. Registered in 1900 for the purpose of acquiring and amalgamating numerous firms engaged in the bleaching trade, this company has an authorised capital of £8,000,000, of which £6,306,237 has been issued and paid up, consisting of £2,487,500 in the form of 5½ per cent. cumulative preference stock, and £3,818,737 in ordinary stock. After meeting the preference dividend, which absorbed £136,812, the balance of £183,360 was carried forward to the next account. During the last three years, a total of £1,137,303 has been charged for depreciation, upkeep and repairs.

A loss of £1,994 sustained by Alexander Drew and Sons, Ltd., the Manchester bleachers, dyers, calico printers and merchants, increased the debit balance of the company's profit and loss account to £4,742, and compelled the passing of both ordinary and preference dividend, while the unsatisfactory figures submitted by Associated Dyers and Cleaners, Ltd., revealed the need for placing the business on a profit-earning basis and for reorganising the capital. Continental Tintex and Dye Products, Ltd., was unable to show a profit for the past year, although the loss of £1,680 represented a decrease of £687 in relation to the deficit shown in the previous tabulation. On the other hand, a slight increase of profit was reported by the Yorkshire Dyeware and Chemical Co., Ltd., and a final dividend of 7½ per cent. on the ordinary share made 10 per cent for the year, although instead of distributing a bonus of 5 per cent., as before, the sum of £5,000 was transferred to reserve, leaving £6,546 to go forward as against £6,638.

Soap and Perfumery

Trade in soap, perfumery, and kindred toilet requisites has not been very profitable, and in the case of J. and E. Atkinson, Ltd., the audited account revealed a net loss of no less than £55,263, this debit being extinguished by the transfer of a like amount from the reserve. This company was registered in 1896, and controls J. and E. Atkinson (France), Ltd., and Pariluxe Parfums, Ltd., the authorised share capital being £450,000, of which a total of £350,000 has been issued and paid up, composed of £50,000 in 6 per cent., tax free, cumulative preference shares, and £300,000 in ordinary shares, all of £1. The ordinary shareholders have received no dividend since 1929, when 7 per cent. was distributed. During 1932, Eugene Rimmel, Ltd., sustained a net loss of £9,539, which compares with a net loss of £13,122 shown in the 1931 account, and had the effect of increasing the debit balance of £12,435. Registered in 1889, this company owns the entire share capital of Breidenbach and Co., Ltd., its own authorised share capital being £90,000 in £1 shares, all of which have been issued and paid up, viz., £40,400 in 7½ per cent. tax free, cumulative preference shares, and £49,600 in ordinary shares. The preference dividend is in arrear as from June 30, 1929. The ordinary dividend of 10 per cent. also the bonus of 2½ per cent., have been maintained by J. C. and J. Field, Ltd., the reduction in the profit margin being offset in the final tabulation by transferring only £6,500 to reserve as compared with £10,000 a year ago, the carry forward being then slightly less at £9,751, while the reserve now amounts to £51,500.

Glue and Gelatine

The final figures of British Glues and Chemicals, Ltd., were made up to April 30, and disclosed a net profit of £45,361 for the past twelve months. This company was registered in 1920 when several businesses were acquired, including the Grove Chemical Co., Ltd., Williamson and Corder, Ltd., etc., and of an authorised share capital of £2,000,000 only £700,000 has been issued and paid up, comprising £525,000 in 8 per cent. cumulative participating preference £1 shares, and £175,000 in ordinary shares of 41s. The payment of one year's preference dividend left arrears as from April 30, 1932. The audited profit and loss account submitted by A. B. Fleming and Co., Ltd., the Edinburgh printing ink and chemical manufacturers, also covered the twelve months to the end of April, the balance of profit working out at £41,145, or an increase of £1,502 in relation to the previous year's figure. This enabled the dividend to be maintained at the rate of 10 per cent. for the third successive year, and a transfer of £5,000 to be made to the general reserve which now shows a credit balance of £75,000, while £7,000 was provided for depreciation of plant, and £1,000 allocated to staff funds.

Tanning Industry

Reports submitted by tanners indicate that profitable business was not distributed very evenly during the past twelve months, some firms sustaining considerable losses while others were able to increase the margin of profit. For the financial year to March, Handford, Greatrex and Co., Ltd., the well-known Walsall tanners, reported a loss of £421, which compares unfavourably with the profit disclosed in the 1931-32 account, and reduced the credit balance to £46. This company has an authorised capital of £90,000 all of which has been subscribed and called up, consisting of £40,000 in 6 per cent. cumulative preference shares—the dividend on which is in arrear since March 31, 1931—and £50,000 in ordinary shares,

upon which no dividend has been paid since 1922-23. In the case of Wm. Mowat and Sons, Ltd., the Stonehaven tanners and leather merchants, the final figures were made up to the end of May, the audited account revealing a net profit of £1,445, or an increase of £379 in relation to the previous year's profit figure, the dividend on the ordinary shares being consequently maintained at the rate of 7½ per cent. Registered in 1901, this company has an authorised share capital of £50,000, all of which has been issued and paid up, composed of £30,000 in the form of 5 per cent. cumulative preferred shares of 10s., and £20,000 in ordinary shares of 6s. 8d. denomination.

Pharmaceutical Products

Trade in drugs has been fairly profitable, and for the most part profit margins have been well maintained. During the financial year to March 31, a net profit of £701,453 was realised by Boots Pure Drug Co., Ltd., this figure representing a decline of £30,438 as compared with the balance shown in the 1931-32 account, the ordinary dividend being maintained at 24 per cent., less tax, plus a bonus of 5 per cent., tax free, for the fifth successive year, and after transferring £100,000 to the general reserve, and allocating a similar sum to the works development fund, there remains a credit of £190,187 to go forward to the 1933-34 account. This concern owns all the ordinary shares of several companies, and is associated with Drug Incorporated through the United Drug Co. The entire authorised share capital of £2,900,000 has been issued and paid up. The preference and preferred ordinary dividends absorb £96,750. The trading account submitted by the Veno Drug Co., Ltd., showed an increased gross profit, but a higher charge for income tax left the net profit slightly lower at £85,633. Nevertheless, the dividend on the company's deferred ordinary shares was raised from 40 per cent. to 60 per cent., absorbing £22,500, and after transferring £20,000 to reserve the carry forward is slightly increased. A loss sustained by a subsidiary company which was formed in Canada during the twelve months for purpose of marketing the products of the parent company, was provided for in the final accounts, and the results may be considered very satisfactory when the difficulties experienced during the past year are taken into account. The entire authorised share capital of £625,000 ranked for dividend, made up of £300,000 in the form of 8 per cent. cumulative preference £1 shares—the dividend on which takes £18,000 after deducting tax—£275,000 in 12 per cent. cumulative preferred ordinary £1 shares—the dividend on which accounts for £24,750, and £50,000 in deferred ordinary shares.

A very substantial increase in net profit was revealed in the accounts of Johnson, Matthey and Co., Ltd., the well-known assayers, gold and platinum refiners, and bullion merchants, the figure working out at £163,693, as compared with £49,782 realised during 1931. As a result, the ordinary shareholders received a bonus of 1 per cent. in addition to the 6 per cent., while £50,000 was transferred to the contingency reserve, and the balance carried forward to the next account. Registered as a private concern in 1891, this company controls Oakes, Turner and Co., Ltd., the authorised share capital being £1,150,000 in £5 shares.

The Bergin Process for Oil from Coal

Inner History of the Introduction of the Process to England

AN interesting letter, giving the inner history of the introduction of the Bergin process to England, appears in "The Times Trade and Engineering Supplement," of August 12. This letter, by Mr. T. L. Gilmour, of London, was prompted by the articles which appeared in "The Times," July 21 and 22, where a special correspondent described the various processes by which oil can be obtained from coal and indicated the immense possibilities opened up by the British Government's decision to give a guaranteed preference for home-produced motor spirit. These articles reminded Mr. Gilmour that it was just 12 years since he brought the claims of Dr. Bergius to the notice of the British Government, and he therefore availed himself of the opportunity to place facts on record whilst documentary evidence is still available. As this letter should be of particular interest to readers of THE CHEMICAL AGE, it is reproduced below.

"It was in the early days of 1921," writes Mr. Gilmour, "that the late Mr. William Dederich described to me the Bergin process. He stated that many millions of gold marks had been spent by the firms of Goldschmidt, Friedlander Fuld and Count Donnersmark in assisting Dr. Bergius to carry out his investigations and experiments, and that a factory had been erected under Dr. Bergius's directions at Rheinau between Heidelberg and Mannheim where 30 tons of oil a day were being treated by the Bergin process and the liquefaction of coal had been proved on a less extensive scale.

A Process of Immense Importance

"From a contemporary record I make the following extract:—'I discussed the matter at some length with Mr. Dederich and we agreed to the two following propositions: (a) That, assuming the claim made by Dr. Bergius to be well founded, the new process would ultimately revolutionise both the coal and the oil industries; (b) That a process which enabled coal to be converted into oil with the results indicated would be a factor of primary importance, both in peace and in war, to an island state, and that accordingly the matter had a political side for Great Britain which could not be ignored.'

"With Mr. Dederich's full concurrence I decided to place the whole matter before the appropriate Government Department and got at once into communication with Sir John Cadman, the then head of the Petroleum Department. My first interview with Sir John Cadman took place about the middle of March. I asked if I should arrange to bring Dr. Bergius to London to see him, and he replied that before he saw Dr. Bergius he would like to have a sample of the oil submitted to him. To this I at once agreed and a small bottle of oil was furnished in due course.

"Official permission for Dr. Bergius to visit England was obtained through the Foreign Office, but owing to various delays it was not until June 10 that I was able to accompany Dr. Bergius to Sir John Cadman's office, where, in addition to Sir John Cadman and his principal assistant, we found Sir George Beilby, the Director of the Fuel Research Board of the Department of Scientific and Industrial Research, and Professor Jocelyn Thorpe, Professor of Organic Chemistry at the Imperial College at South Kensington.

"The interview lasted two hours. For the first hour and a half Dr. Bergius gave a brief historical sketch of the method by which he had developed his process and described fully the process itself and the technical means he had adopted to obtain the desired results. During the last half-hour Dr. Bergius answered fully and frankly all the questions which were put to him.

Developments Outside Germany

"To regularise the financial position and to provide the further funds required, a company had been formed in Germany by powerful groups already named in which the respective interests of the participants and of Dr. Bergius were defined. It was decided to retain the German rights under exclusive German control, but to seek outside Germany for further support in developing the process in the other countries of the world. When Mr. Dederich was first approached the Royal Dutch Oil group had already acquired, from the German company financing Dr. Bergius, an option to take over a 50 per cent. interest in the world rights of the Bergin process outside Germany and had spent considerable sums in further development work. The original option to the Dutch group had been extended to January 31, 1922.

"It was in these circumstances that Mr. Dederich had obtained from the German group a provisional option to acquire the rights both for coal and oil for the whole of the British Empire, and for certain other countries, including Persia and Egypt. This provisional option was subject to the subsequent approval of the Dutch group, should it exercise its option to acquire a half interest in the world rights outside

Germany, but the representatives of the German company were confident that the approval of the Dutch group would not be withheld.

"After Dr. Bergius's interview with Sir John Cadman and the other representatives of the British Government steps were taken to bring the business to the notice of Sir Charles Greenaway (now Lord Greenaway), the then chairman of the Anglo-Persian Oil Company.

"The next move was that in August the Royal Dutch group intimated that it was prepared to exercise its option without waiting for the expiry of the option period. A meeting was accordingly arranged early in September between the German and the Dutch groups to settle the final terms of the agreement under which the world rights, exclusive of Germany, were vested in a Dutch company, the Bergin International Company, the capital being equally divided between the German and Dutch groups. An intimation was conveyed to Mr. Dederich by the German group that it would be desirable that representatives of British interests should be available in Holland as it was proposed, as part of the arrangements to be discussed, to invite the Dutch group to agree to the provisional option being given over the British and other rights.

"It was found possible for Dr. A. E. Dunstan, the chief chemist of the Anglo-Persian Oil Company, to accompany Mr. Deredich and myself to The Hague, where we arrived on the evening of September 7.

A Provisional Option Granted

"The negotiations followed the anticipated course, both groups confirming the provisional option granted to Mr. Dederich. While the negotiations were in progress Dr. Dunstan availed himself of the opportunity to discuss various technical matters with Dr. Bergius—whom he met for the first time—and with Dr. Bergius's technical assistants. From The Hague the party went on to Heidelberg and Dr. Dunstan was given every facility to make a thorough examination of the factory at Rheinau. As we left he said to me: 'This is not an invention, it is a revolution,' and in the subsequent negotiations with the Anglo-Persian Company, Dr. Dunstan remained a firm advocate of the acquisition by the Anglo-Persian Company of the British rights in the Bergin process.

"It would serve no useful purpose to give even in outline an account of the negotiations with the Anglo-Persian Company which extended over the next twelve months, or to explain how it was that, after the heads of a proposed agreement had been initialled, the negotiations finally fell through.

"The failure to reach an agreement was in no way due to to any doubts as to the ultimate value of the process, although it was recognised that much work still remained to be done before hydrogenation could be accepted as a commercially practicable proposal on a large scale. The magnitude of the task from a financial point of view and the necessity of commanding technical advice of the highest order rigidly restricted the area from which assistance could be sought. Lord Milner, who fully recognised the national importance of the issues involved, interested himself to the extent of giving personal introductions, and Lord Haldane, no less alive to the same aspect of the problem, asked to be kept informed of any developments which took place.

Failure to Reach Agreement

"After strenuous endeavours extending over a further year, Dr. Dederich and his associates saw little chance of being able to carry the matter to a successful issue, and Dr. Bergius turned in another direction. He had for some considerable time been devoting much attention to the problem of the extraction of sugar from wood, an enterprise in which he was brought into association with the well-known chemist Dr. W. R. Ormandy. Putting on one side the idea of obtaining from any single firm the necessary financial and technical support for developing the Bergin process, Dr. Ormandy decided to try the method of combination. At Dr. Bergius's request the writer continued for some years to act as his personal representative in this country.

"The rest of the story may be briefly told. Dr. Ormandy succeeded in organising under the title "The British Bergius Syndicate" a very powerful group of about a dozen individuals and companies the combined capital of which was well over £100,000,000 sterling. These companies, representing some of the largest gas, steel, coal, coke, and chemical industries in the country, subscribed in varying proportion a capital of £23,000 to enable further tests, particularly with English coals, to be carried out here and in Germany. An arrangement was also made by which the British Government undertook the responsibility for certain experimental work at the Greenwich Station of the Fuel Research Board. Subsequently Sir Alfred Mond intimated a desire to be associated in the work, and it was arranged that Brunner, Mond and Co. should subscribe a further £10,000 to the capital of the syndicate, which gave them much the largest individual interest. At a later stage it was arranged that Imperial Chemical Industries, Ltd., should buy out the other participants of the syndicate, and the world rights in the Bergin process are now held by International Hydrogenation Patents, Ltd., formed in 1930 at The Hague, in which Imperial Chemical Industries, Ltd., the Shell Mex Company, the Standard Oil Company, and the I. G. Farbenindustrie are participants."

Iron and Steel Institute

Autumn Meeting at Sheffield

THE autumn meeting of the Iron and Steel Institute will be held in Sheffield, from Tuesday to Friday, September 12-15. The sessions for the discussion of papers will take place in the Mappin Hall of the University of Sheffield, St. George's Square, on Wednesday and Thursday, commencing each day at 10 a.m.

Papers to be submitted at the meeting include the "Fifth Report on the Heterogeneity of Steel Ingots," by the Joint Committee of the Iron and Steel Institute and the National Federation of Iron and Steel Manufacturers; "The Effect of Tin as an Impurity in Mild Steel" (J. H. Andrew and J. B. Peile). "Notes on the Utilisation of Blast-Furnace Gas" (W. B. Baxter), "Heat Conservation at the Normanby Park Steel Works, Scunthorpe" (W. J. Brooke): "The Influence of Beryllium on Steel" (J. H. S. Dickenson and W. H. Hatfield); "The Thermal Conductivity of Wrought Iron, Steel, Malleable Cast Iron and Cast Iron" (J. W. Donaldson); "Alloys of Iron Research. Part XI.—The Constitution of the Alloys of Iron and Manganese" (M. L. V. Gayler); "Some Experiments on the Resistance to Wear of Nitrogen-Hardened Cast Iron" (J. E. Hurst); "The Effect on Various Steels of Hydrogen at High Pressures and Temperatures" (N. P. Inglis and W. Andrews); "A Coke-Fired Reheating Furnace" (F. Lloyd and R. V. Wheeler); "Improving the Coking Performance of Weakly-Caking Coals" (R. A. Mott and R. V. Wheeler); "Some Properties of Cold Worked Sorbitic and Austenitic Alloy Steel Wire" (S. H. Rees); "Some Factors Leading to Great Production from a Steel Furnace" (A. Robinson); "The Effects of Pickling on the Properties of Carbon Steels" (I. G. Slater); "A Note on the Effect of a Backward Pull upon the Tension Required to Draw Wire" (F. C. Thompson); and "A Method for the Electrolytic Extraction of Slag from Iron and Carbon Steel" (R. Treje and C. Benedicks).

Synthesis of Vitamin C

Current Researches

REVIEWING current vitamin C researches in the "Chemiker-Zeitung," 1 July, 1933 (p. 513), A. Lüttringhaus cites evidence of the identity of this vitamin with ascorbitic acid. It has been shown that the latter, which has been synthesised by Reichstein ("Helv. Chim. Acta," 1933, *16*, 561), exhibits an antiscorbutic action superior to all previously-known vitamin C preparations and retains its activity even after repeated crystallisation or after purification of its acetone compound. Reichstein utilised d-xylose as the starting point of synthesis, the osone being condensed with hydrocyanic acid and the resulting nitrile saponified to the free acid. Prepared in this manner, vitamin C takes the form of colourless needles or plates melting at 192° C. and exhibiting mutarotation. In view of its comparatively simple structure and the ease with which related substances can be prepared, it is to be expected that vitamin C will now permit of a more exact study of the functions of vitamins in the organism than has been found possible in the case of other substances of this class.

Trouble-Free Gas Purification

Determining the Dimensions of a Purifying Plant

The following notes on purifier design have been supplied by Thomas Duxbury and Co., the sole British selling agents for " Lux " gas purifying material. They should prove of general interest on the subject of gas purification, and of the factors which arise in purifier design.

ACCORDING to the law of mass action, the velocity of absorption of hydrogen sulphide by iron oxide is proportional to the third power of its concentration in the gas. As in most reactions between gases and solids, however, surface phenomena enter into the reaction and introduce complications. The rate of reaction is, therefore, governed by factors such as the nature and extent of the surface exposed per unit volume of purifying material and the ability of the surface to absorb moisture. Although little is known with regard to this aspect of the problem, it appears that the influence of the surface predominates and masks the effect of the concentration of hydrogen sulphide on the velocity of the reaction.

Influence of Temperature

The influence of temperature on the sulphiding reaction has been studied by several investigators, and the importance of the control of temperature has long been appreciated in plant operation. British experience seems to indicate that the best results are obtained by maintaining a temperature of 70° F. to 80° F. in the purifiers, and by avoiding fluctuations as far as possible. American investigators, however, favour somewhat higher temperatures. They consider the most favourable temperature to be about 100° F., as with the effect of changes in the concentration of hydrogen sulphide in the gas any variation of the velocity of the sulphiding reaction due to a change in temperature is partly masked by a simultaneous alteration in the reactivity of the iron oxide. The latter factor varies with the temperature over different oxides, the variation being more pronounced with the natural bog ores than with manufactured materials such as " Lux." This confers an advantage on such prepared materials, in that control of the temperature need not be so strict. The quantitative effect of changes in temperature, however, cannot be expressed in any formula, and, for purposes of design, it must be assumed that conditions are suitably adjusted.

Activity of Iron Oxides

The most complex factor in the sulphiding process is afforded by the " activity " of the oxide, which varies very widely with different natural and manufactured products. Numerous attempts have been made to define " activity " and to devise a method of assessing the ability of different purifying materials to remove H_2S from gas. The activity of an oxide is largely influenced by process conditions and certain properties of the material itself. Among these the alkalinity of the material, its moisture content and its physical condition have an important bearing on the reaction. Most of the natural products show considerable variation in these characteristics, but greatest consistency in this respect is found in a manufactured material like " Lux," which, on account of the conditions of manufacture, is always a uniform product, possessing definite properties. The advantage of the uniformity of " Lux " is not only felt in the operation of the purifying process, but is also of appreciable value in the design of purifying plant, which can be based on definite data and will give the optimum size consistent with reliability and economy of working. In the absence of a purifying material of definite characteristics, a large factor of safety must be taken in order to meet the contingency of the oxide supplied falling below standard. The dimensions of the plant thus become unduly large and its cost unnecessarily high.

Back Pressure

Up to the present, it has not been found possible to operate a continuous process, largely on account of the difficulty of obtaining a purifying material in a sufficiently fine state of division, while containing the water necessary to render the material active. The possible loss of fine material as dust is also a serious drawback and its obviation presents great technical difficulties. Consequently, the static method is still almost universally adopted for dry purification. Likewise, in all modern plants, revivification *in situ* and a system of changing the sequence of the boxes has become standard practice. The volume of material required in a given case is then expressed by a formula.

This single figure is insufficient to define completely the dimensions of the plant, for a given volume of material can be disposed in an unlimited number of combinations of area and depth. In practice, choice in this respect is limited by considerations of the back pressure permissible in the plant and the ground space available. Back pressure is due to the resistance of the material to the passage of gas. It varies widely with different materials and with the physical condition and moisture content of any one material. It has long been known in practice, though rarely mentioned and never emphasised in technical literature, that the resistance to the flow of gas through purifying material, as indicated by the back pressure, is proportional to the first power of the linear velocity of the gas through the free space, and not to the square of the velocity, as is the case generally with flow through pipes. This is due to the fact that a mass of porous material behaves as a collection of fine capillary tubes, in which the flow is viscous. The resistance is therefore directly proportional to the volume of gas passing in unit time and to the depth of the material.

Resistance to Gas Flow

The same conception also serves to explain why different materials exhibit such wide variations in resistance to gas flow. In viscous flow through a tube, the resistance varies inversely as the fourth power of the diameter of the tube. The size of the interstices in a mass of material is therefore of primary importance, and two materials of equal porosity will show a considerable difference in their resistance to the passage of gas, if the particle size is different in the two cases. Although the total free space is the same in each material, the individual interstices are smaller in the finer-grained substances and the resistance is correspondingly greater. For example, if the particles of one material are one-half as large as those of the other, the loss of pressure incurred by the passage of the same quantity of gas per hour through the same depth of material will be approximately four times as great.

The effect of the moisture content of a material on its resistance to the flow of gas is similarly explained. In the dry material, the particles and interstices are small and the resistance to the passage of gas consequently high. The absorption of water causes a swelling of the particles and an increase in the size of the interstices, so that the resistance to gas flow is diminished. If the water added is excessive, the free space in the material is again restricted, so that the existence of an optimum moisture content is seen to follow as a matter of course.

Nominal Linear Velocity

For purposes of design, it has generally been assumed that a nominal linear velocity of 1 ft. to 2 ft. per minute should be aimed at. This nominal figure is purely fictitious, and is arrived at by assuming that the whole cross-section of the material, through which the gas is flowing, is free space. In a similar manner, a nominal figure for the time contact is often calculated. If a volume of R cu. ft. of material is required per 1,000 cu. ft. of gas per hour, the nominal time contact is R/1,000 hours, *i.e.*, 0.06R minutes. In order to obtain a linear velocity between 1 ft. and 2 ft. per minute, the depth of material should be between 0.06R and $2 \times 0.06R = 0.12R$ ft. Hence, the area of purifier that should be allowed for each 1,000 cu. ft. of gas per hour varies from $R/0.06R = 16.67$ sq. ft. for a velocity of 1 ft. per minute to $R/0.12R = 8.33$ sq. ft. for a velocity of 2 ft. per minute.

It should be noticed that, as previously mentioned, the figures calculated for the linear velocity of the gas through the material and the time contact between gas and material are imaginary magnitudes. Since, in general, the free space

in purifying materials varies from 50 to 65 per cent. of the total volume, the true linear velocity corresponding to 1 ft. and 2 ft. per minute, is 1½ ft. and 4 ft. per minute respectively. The true time contact is then 0.030R and 0.039R minutes in the two cases.

Cross Sectional Area

In plant practice a fairly wide choice for the cross-sectional area of purifiers is found, the value decided upon in a particular case being dependent upon the characteristics of the material. Bog ores are generally of open texture, and no difficulty is experienced in realising a nominal linear velocity of 2 ft. per minute. The cross-sectional area should then be 8.33 sq. ft. for each 1,000 cu. ft. of gas treated per hour, the total depth of oxide being 0.12R ft., *i.e.*, 0.03R ft. in each box. Manufactured materials as a rule offer a greater resistance to the passage of gas, and it is generally desirable to allow a larger area corresponding to the lower linear velocity of 1 ft. per minute. This can be effected by using boxes of the same dimensions, but dividing the flow of the gas in each box. The efficiency of removal of hydrogen sulphide is thereby in no way affected, since the time contact remains the same, but the area of cross-section of the material is doubled. This principle of dividing a box into a number of layers, with separate admission of the gas to each layer, is a comparatively recent innovation in purifier design, and is especially useful where the available ground space is limited. Theoretically, there is no limit to the number of sub-divisions in a purifier. By employing N layers, the area of cross-section of each box need only be 16.67/N sq. ft. per 1,000 cu. ft. of gas treated per hour to obtain a linear velocity of 1 ft. per minute. The latest development of the principle is exemplified in the tower purifier, where as many as fourteen layers have been employed.

A Typical Example

The use of these formulæ is best illustrated by an example:

Basic Data for Design of Plant.

Capacity: 100,000 cu. ft. of gas per hour.

Concentration of Hydrogen Sulphide.

500 grains of hydrogen sulphide per 100 cu. ft.

Characteristics of Purifying Material.

Active iron content 18 per cent. Fe_2O_3.

Bulk density 50 lb. per cu. ft.

The volume of purifying material required per 1,000 cu. ft. of gas treated per hour is then obtained from the formula:

$$R = \frac{4{,}050}{FW} \sqrt{S}.$$

In the example given: S = 500, F = 18 and W = 50.

$$\text{Hence } R = \frac{4{,}050}{18.50} 500 = 101 \text{ cu. ft.}$$

A plant dealing with 100,000 cu. ft. of gas per hour, therefore, should contain 10,100 cu. ft. of purifying material of the above characteristics or 2,525 cu. ft. per box, if the set consists of four boxes.

When considerations of ground space impose no limitations, each box should be given a cross-sectional area of 8.33 sq. ft. per 1,000 cu. ft. of gas treated per hour, if a material of fairly open texture is employed. The area of each box will be 833 sq. ft. The depth of purifying material in each box is then 2,525/833 = 3 ft., which should be sub-divided into three layers of 12 in., supported on wooden grids. This subdivision is a safety measure against the development of cracks in the material and consequent by-passing. It also helps to keep the back pressure of the material at a minimum and redistributes the gas at intervals, thus preventing uneven fouling.

The area recommended for purifying materials of close texture is 16.67 sq. ft. per 1,000 cu. ft. of gas treated per hour. If such material is to be used, the area required would be 1,667 sq. ft. per box, so that the material would have a depth of 2,525/1,667 = 18 in. A shallow purifier of this depth is impractical and costly, 24 in. being probably the lowest limit of depth. Purifiers with divided gas stream and correspondingly smaller cross-sectional area would be employed. This type is particularly useful in the absence of adequate ground space, and the area of a tower becomes 1,667/14 = 119 sq. ft. The gas would pass through a layer of oxide of 18 in. depth.

New Resin Laminating Base

Investigations at Mellon Institute

RECENT investigations at Mellon Institute of Industrial Research, Pittsburgh, have resulted in the adaptation of "Robertson bonded metal" to meet the needs of the resin-laminating industry. The new material evolved by this developmental work facilitates the manufacture of decorative resin finishes, and it is believed that these short-cuts in procedure are of economic significance to companies interested in producing such finishes in the highly competitive field of building construction. The fibre-coated metal, a steel sheet with an applied surface particularly adapted to provide anchorage for an adhesive, fits admirably into the general practice employed in preparing resin-veneered sections. The fabric surface offers ideal anchorage for resin adhesives, and, when penetrated by the resin, gives a fibre-reinforced glue line with both fibres and adhesive attached to the metal, resulting in a bond approximately 45 per cent. stronger than is possible by present methods of attachment to etched steel. Further advantage lies in the fact that the fibrous layer serves the very important function of supplying a cushioning action between the relatively non-compressible metal and veneer layers, thus insuring a more uniform contact and adhesion in the laminating operation.

Laminated resin is made by superimposing layers of resin-impregnated fabric or paper, and combining them, under the simultaneous application of heat and pressure, into a dense, homogeneous sheet. It has been found to be perfectly feasible to substitute a sheet of Robertson bonded metal with the fibrous surface layer, or layers, impregnated with resin for all or part of these fabric or paper layers, to get a strong laminated sheet of similar appearance but having a steel core or backing. The procedure followed in utilising the metal in this manner departs from that of the production of laminated resin sheets only in the methods necessary for handling and drying the metal reinforced sheets of fabric. One pressing operation is all that is required to produce a finished veneered steel panel. Economies in time and materials are secured through the elimination of the operations involved in attaching pre-formed laminated veneer to the backing and through the use of thinner surface layers made possible by eliminating all handling ordinarily involved in the use of laminated veneer. Veneered steel panels presenting very attractive surface effects may be obtained by selecting coloured and printed fibrous layers for the Robertson bonded metal, saturating with resin varnish, drying, and pressing to cure the resin and to secure the desired finish. The most economical combination is that in which the metal is designed to supply all the desired strength, depending upon very thin veneer layers only for decorative effects.

Leather Trades' Chemists

Annual Conference at Amsterdam

THE annual conference of the International Society of Leather Trades' Chemists will be held at the Royal Colonial Institute, Amsterdam, September 18-21. The presidental address will be delivered by F. C. Thompson. On Wednesday, September 20, there will be a joint meeting with the International Tanners' Council to discuss the preservation and damage of hides Dr. H. R. Kruyt (Utrecht) will lecture on "Colloid Chemistry of Collagen and Gelatin" (in English), and Dr. J. H. Priester on "Old and New Materials for Patent Leather Manufacture" (in German). Papers to be presented will include: "X-ray Spectograph of Albumen with Relation to Collagen and Gelatin" (Professor J. R. Katz); "The Tanning Properties of Sulphite Cellulose Extracts" (Dr. W. Vogel); "Contribution to the Characteristics of some Special Vegetable Tannings" (Dr. F. Stather); "Deterioration of Vegetable Tanned Leather" (Professor D. McCandlish and W. R. Atkin); "The Fixation of Vegetable Tannins by Chrome Leather" (Dr. K. H. Gustavson); "The Glass Electrode and Sulphonated Oils" (Dr. D. Burton and G. F. Robertshaw); "Oxidation of Fish Oils by means of Chromic Acid and Bichromates in the presence of Acid" (A. Dohogne and G. Rezabek); "Sodium Thiosulphate as Neutralising and Reducing Agent in Leather Manufacture" (F. Prakke); "Detection of Sulphiting in Vegetable Tanning Extracts" (O. Gerngross and H. Herfeld).

New Technical Books

INDUSTRIAL CHEMISTRY. By William Thornton Read. pp. 576. Chapman and Hall, Ltd. 31s. net.

This book aims at giving an adequate and well-balanced picture of modern industries from the viewpoint of chemicals, chemical engineering operations, source of raw materials, use of products and economic relationships. Recognising that no one man, either from personal experience or by reading, can write with authority about the multitude of processes which are found in chemical industry, the author has submitted every chapter to authorities in their respective fields. In this way he has incorporated authentic information from ninety different individuals. The first few chapters are devoted to the relation of chemistry to industry, the work of chemists and chemical engineers, chemical organisations, sources of information in chemical literature, analytical control and chemical economics. These are followed by others dealing with unit operations and equipment, materials of construction, chemical engineering units and calculations, and power plant chemistry. Subsequent chapters cover the various chemical industries, including sulphuric acid, fixed nitrogen, silicates, alkali, fertilisers, hydrochloric acid, electro-chemical processes, metallurgy, petroleum, animal and vegetable oils, fats and waxes, carbohydrate industries (sugar, starch, cellulose, etc.), protein industries (wool, silk, gelatin, leather, etc.), rubber, coal products, synthetics, explosives, paints and varnishes. The plant illustrations which are given are line drawings, generally with cross section, and in all cases adequately provided with explanatory legends. These drawings have been specially prepared by firms who are interested in the design and fabrication of the plant in question, and they are a model of what illustrations should be. Another special feature is the binding of the book, which has been made water-proof and vermin-proof by a new process of impregnating the cloth with pyroxylin.

* * *

SICHERHEITGLAS. (THE MANUFACTURE, PREPARATION, USE AND ECONOMICS OF NON-SPLINTERABLE GLASSES. By D. H. G. Bodenbender. pp. 320. Chemisch-Technischer Verlag Dr. Bodenbender, Berlin-Steglitz. Rm. 18.

With the rise of the automobile and flying industries the development of safety glass has come to occupy a position of foremost interest, for it is an important means of avoiding serious casualties in automobile and traffic smashes. About 70 per cent. of these casualties have been caused by glass splinters; on these grounds many countries have seen fit to make safety glass compulsory for public vehicles. In spite of this, this rising industry has not yet been dealt with in a comprehensive manner as regards literature. The present volume, therefore, fills a gap in giving for the first time a review of the whole subject of the manufacture, preparation, use and economics of safety glass which is based on quite practical considerations. After a review of the historical development of the safety-glass industry the various types of safety-glass are described. There follows an exhaustive description of the manufacturing methods employed for multi and single-layer safety-glass, containing many clear diagrams. The causes of defects are then dealt with and the methods of avoiding them outlined. A further chapter on the planning, erection and equipment for a safety-glass factory follows; this should be of interest for those who are considering entering the field of safety-glass manufacture.

* * *

TWENTY-FIVE YEARS OF CHEMICAL ENGINEERING PROGRESS, 1908-1933. Silver Anniversary Volume of American Institute of Chemical Engineers. Edited by Sidney D. Kirkpatrick. pp. 387. D. Van Nostrand Co. $4.00.

Twenty-five years of chemical engineering achievement in America in virtually all branches of the industry is summarised in the twenty-five essays by recognised authorities comprising this volume. Each essay reviews the progress made during the last quarter century in a definite industrial field. Arthur D. Little traces the history of researches and touches on the most significant developments in this line and their implications to manufacturer, banker and the general public. E. R. Weidlein, director of Mellon Institute, in collaboration with L. W. Bass, present a statistical survey of the economics of the chemical industries for the period 1909-31, showing, among other things, the number of establishments, wage earners and salaried employees in the different branches of the industry, together with data on wages, salaries, cost of materials, value of output and manufacturing profits. Manufacturing indexes of different industries, fuel and power consumption, exports and imports and financial aspects, too, are set forth in tabular form with explanatory notes. Other contributors discuss specific rather than general features of certain chemical industries. For example, W. S. Landis, of the American Cyanamid Co., discusses advances in the electrochemical industries; F. C. Frary, of the Aluminium Company of America, writes on electro-metallurgical progress with special emphasis on the ferro-alloys; A. T. Weith and A. V. H. Mory, both of the Bakelite Corporation, review plastics as an old industry recently revitalised by modern chemical technique. George Oenslager, this year's Perkin Medallist, reviews the chemical and engineering advances in the rubber industry, especially in connection with accelerators; H. W. Sheldon traces cracking developments in petroleum refining; and C. O. Brown, of the Chemical Engineering Corporation, discusses chemical engineering's most brilliant recent development, high pressure synthesis, with special reference to hydrogenation of petroleum, the making of synthetic ammonia, and methanol, the design of equipment and the selection of catalysts. Twenty other none the less distinguished chemical engineers write on a quarter century's trends in their particular fields which range all the way from chemical engineering education to water, sewage and trade waste treatment and from acids and heavy chemicals to sugar, paper, glass and paint making.

* * *

QUANTITATIVE ORGANIC MICRO-ANALYSIS. By Fritz Pregl. Second English Edition. Translated by Ernest Fyleman. pp. 237. J. and A. Churchill. 15s. net.

A characteristic feature of modern research in organic chemistry, whether of industrial or purely scientific nature, is the increasing attention which is given to compounds present in relatively minute amount, and a recognition of the important part which they may play. Many a works' difficulty or erratic occurrence during large scale industrial operations is ultimately found to be due to the unexpected presence of some obscure compound in very small quantity. The isolation of such compounds is a tedious and costly operation, and methods of analysis of such materials, which can be practised on minute amounts, fulfils a very serious requirement. This book contains detailed direction for the determination of carbon and hydrogen in minute amounts of organic material, the gas-volumetric determination of nitrogen by the micro-Dumas and the micro-Kjeldahl methods, and the micro-analytical determination of the halogens, sulphur, phosphorus, and arsenic. There are also chapters on quantitative mico-electro analysis, and upon the determination of carboxyl, methoxyl, ethoxyl, methyl and acetyl.

Paint Products in India

Market Restricted by Domestic Production

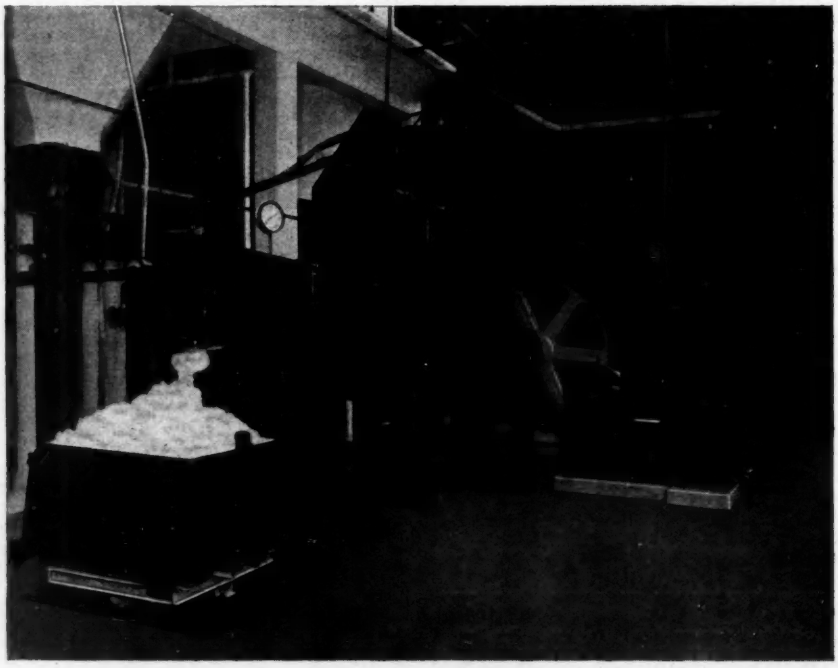
PRIOR to 1931 British India imported annualy about 14,500,000 rupees worth of paint products. These imports have been reduced in recent years owing to restricted purchases and progress made by the domestic industry in the manfacture of these materials. For the fiscal years 1930-1931 and 1931-1932 total imports of paints, pigments, and varnishes were respectively £16,812,850 and 8,753,101 rupees. Great Britain is the leading country of origin for the imports and is represented in the trade by approximately 73 per cent.; followed by Germany 7 per cent.; United States, 5 per cent.; Belgium, 3 per cent.; and Japan, Netherlands, and Italy each with 2 per cent., while the small balance was furnished by other countries. Official data released in 1932 by the Government reported that in 1929 there were 9 paint factories employing 1,628 persons operating in India. This year four of these factories closed down but two additional plants were placed in operation in Bombay. Three of the largest plants are owned by British firms while another is closely associated with one of the largest manfacturers of paints in Great Britain.

Works Equipment News

An Outstanding Advance in Continuous Vacuum Filtration

FOLLOWING exhaustive tests in its experimental stages and after being in commercial service for upwards of two years, the "Waring" patent continuous vacuum filter, or multiple effect de-waterer, has now been placed on the market. Since its introduction for the continuous and efficient filtration of liquids from such difficult material as sedimented and plastic solids, this system has been recognised as one having enormous possibilities in an extremely wide range of industries.

The standard design, as shown by the accompanying line illustration, consists essentially of a filter chamber in the form of a cylinder, the filter surface being fabric or other suitable medium carried on longitudinal teak laths. The body of the machine in which the laths are arranged forms a vacuum chamber, and is coupled up to a vacuum pump or existing vacuum system. The ends of the cylinder are of cast iron or stainless steel. A hollow shaft, passing longitudinally through the filter chamber, carries a series of paddles or flights which serve to spread material on the filtration surface and maintain its movement in the direction of the discharge end of the machine. The paddles, which may also be of stainless steel, have a small but definite clearance between their tips and the filter surface. This clearance is of utmost importance and has been determined as the result of prolonged research and may be pre-determined in regard to the characteristics of the material to be handled. At intervals throughout the length of the filter chamber, division or pressure plates are arranged with apertures or gates. These plates offer resistance to the passage of material along the filter chamber, resulting in a pressing or squeezing effect on the material, with consequent increased liberation of moisture which is removed by the vacuum condition surrounding the total area of the external filter surface.



The Waring Patent Continuous Vacuum Filter or Multiple Effect De-Waterer.

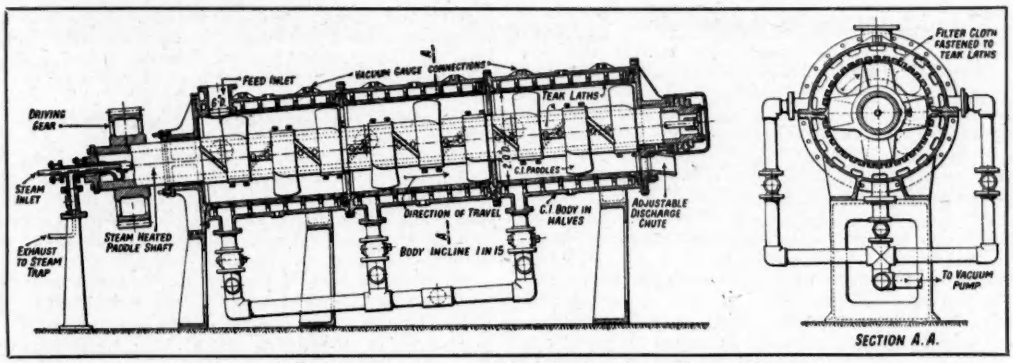
A Combination of Unit Processes

Steam may be admitted to the interior of the paddle shaft, as on certain classes of material this materially assists filtration and acclerates reactions when such an effect is desired. Alternatively, water may be circulated for the purpose of cooling or coagulating. A further feature, the utility of which will be readily apparent in respect to certain processes of extraction, is that steam can be admitted through perforations in the shaft to act directly upon the material in process. In such cases the filter surface can be made of gauze, using phosphor bronze or some other suitable alloy.

The operating principle of this machine is, therefore, a combination of filter pressing, vacuum filtration and steam heating. Material carrying sufficient moisture to be flowable, is fed by gravity to the feed inlet, preferably through a "sight feed." The paddles then spread the material over the filtering surface, at the same time imparting a certain amount of pressure in conjunction with the division plates. This, with the effect of vacuum from the outside of the filtration surface causes water to be extracted from the magma, such water being drawn to an intermediate collecting chamber by the vacuum pump. When recovery of the filtrate is not required a simple type of wet vacuum pump can be employed, the filtrate running to waste. The clearance between the paddle tips and the filtration surface allows maintenance of a layer of material of definite thickness. The action of the paddles has the further effect of breaking up the filter pack thereby presenting fresh surfaces to the vacuum pull with consequent extraction of moisture. At each division plate this extraction is intensified, the thickened material passing forward to the following compartment. This action or combination of actions is continuous and goes on until the material is discharged through the outlet of the machine.

Varying the Degree of Dryness

The degree of filtration, or dryness of the product, is controlled by the opening or restriction of slides at the outlet gate, adjustments being effected by hand-wheel operated rack and pinion with a locking device to maintain the setting of the gap. Maintenance costs on the machine are negligible, there being no undue wear or strain on the filtration surface, proof of which is the fact that a machine has been in constant operation for a period of upwards of two years without any renewal of the original filter cloth. Supervision of the machine is limited to maintenance of constant feed and other



The Waring Patent Continuous Vacuum Filter: Section showing Internal Construction.

routine, such as lubrication. If the use of a "filter aid" or "filter cel" is necessary, such an expedient is particularly applicable to the "Waring" system, and although, in general, the filtrate without such aid is fairly clear, there are cases where the use of this inert cel will be advantageous. The theory of the filter cel need not be referred to in detail; suffice it to say that the material used for this purpose consists of specially selected and prepared diatomaceous silica which forms a barrier to the passage of minute particles which would otherwise pass out with the filtrate. The filter aid may be super-imposed upon the filtration surface before the main feed commences or may be incorporated with the feed in suitable proportions.

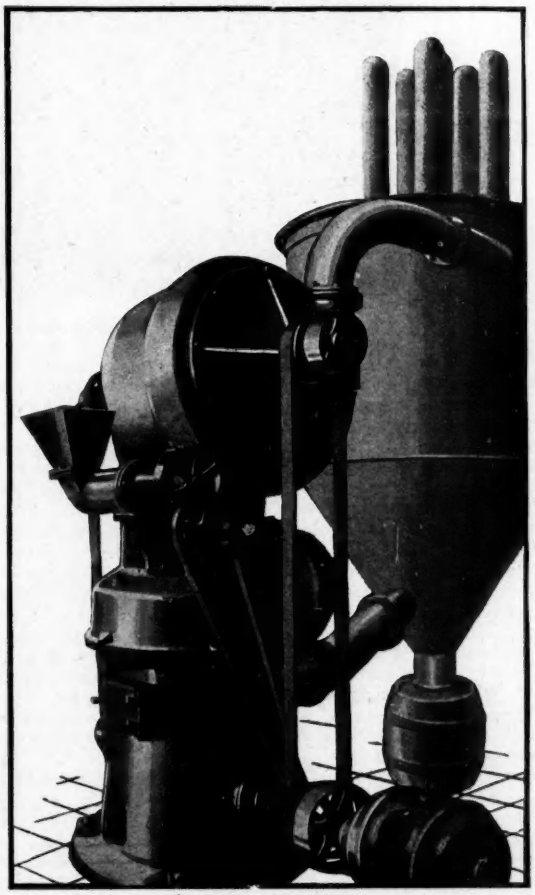
A Concession to Prospective Users

Although it is obviously impossible to give definite figures without a preliminary investigation into the characteristics of various materials, the results tabulated hereunder from full scale commercial tests will indicate the efficiency of the system. For china clay, wherein the initial water content of the slip was 70-75 per cent., and the water content of discharged material was 26 per cent., the machine dealt with this material very satisfactorily, the de-watered product being hard and dry to the touch. In the case of lime-chalk sludge from a water treatment plant, the initial water content of the sludge was 79.6 per cent., and the moisture content of the discharged material was 22 per cent., here the existing filter of a competitive make was incapable of producing a cake below 50 per cent .water content. Very satisfactory results were obtained in an extended test on a cement slurry of a different nature, where the clay content was particularly finely dispersed an outstanding feature being that practically no loss of solids was apparent in the filtrate.

Sole manufacturing and selling rights in the "Waring" vacuum filter for Great Britain have been acquired by Samuel Hodge and Sons, Ltd., who, in collaboration with the inventor of the system, are prepared to advise prospective clients on the applicability of the machine to their filtration problems and arrange for tests on a commercial scale. The licensees, appreciating that in certain processes it is impossible for prospective users to have tests carried out off their premises, are prepared to loan a machine for test users' works if a preiminary consideration of the problems involved indicates the possibility of successful application.

A Novel Design in Grinding Mills

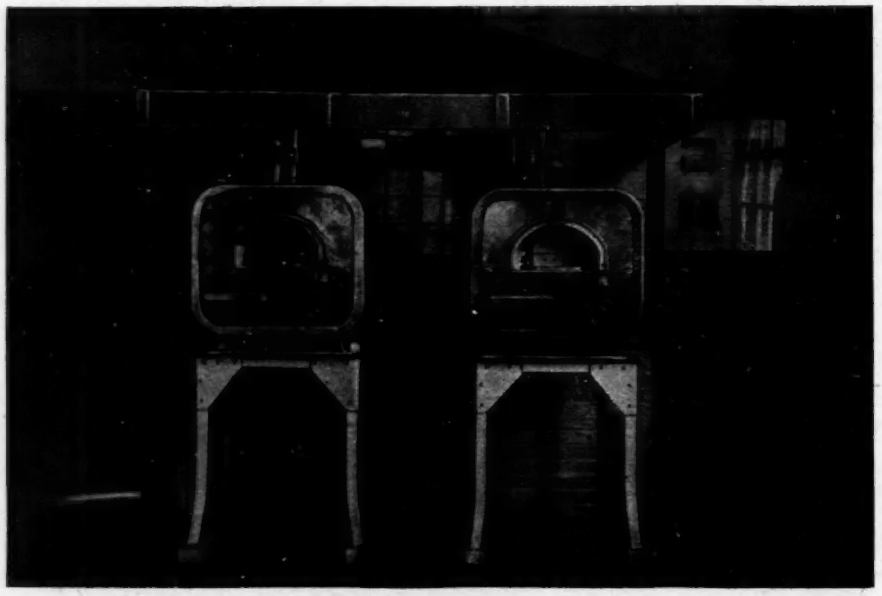
THE Hildebrandt fine grinding mill, for which L. A. Mitchell, Ltd., have been appointed sole British agents, is capable of grinding hard and soft materials such as dyes, iron oxides, earth colours, minerals, etc., reducing them to a fineness of 330 mesh. This degree of fineness can be readily adjusted within wide limits. The mill operates together with an air separator, whereby the finest separation is made. The balls forming the grinding medium are contained in a circular grinding chamber, consisting of a stationary grinding ring and revolving bowl. The material to be ground is fed continuously into the bowl where it is thrown by centrifugal force, together with the balls, against the grinding ring ,which, in turn, throws the balls and material back into the bowl. A continuous air current sweeps down into the bowl, picking up the fine material and carrying it through a centrifugal air sifter of novel design. This consists of a fan wheel rotating at high speed. As the material must pass through this wheel from the outside towards the centre, the effective opening presented depends on the relative speed of the material and the wheel. Circulation of the air is provided by a fan, mounted alongside the sifter but separately driven. Material rejected by the sifter returns to the mill for further grinding. The finely ground material from the sifter is discharged by the fan to a cyclone, where it is separated from the conveying air, which then returns to the mill. To adjust the fineness of the finished product, it is only necessary to alter the speed of the sifting wheel. Sifter and air separator can be supplied to operate in conjunction with existing grinding mills, or for separating problems.



The Hildebrandt Fine Grinding Mill.

Aluminium in the Laboratory

THE lightness of aluminum is one of those outstanding facts of general knowledge which impresses itself on the the mind, and so strikingly different is aluminium in this respect from other common metals that this characteristic outshadows its other properties. Yet these other properties are often of even greater importance in industry than its low weight, and as a particular instance, the quantities of aluminium employed in the various branches of the gas industry are used not so much because of lightness, but because aluminium is immune from chemical attack by the majority of the products of coal distillation, by the majority of the by-products of gas manufacture, and by the products of combustion of gas itself. This is still more striking because some of the substances concerned have a very pronounced action on other metals. Sulphur and sulphurous gases such as hydrogen sulphide have a serious corrosive effect on copper and brass; ammonia and ammoniacal liquors have a strong action on iron and steel; but aluminium can be used freely with such substances, with



Assay Muffle Furnace Installation, showing Casing and Main Castings of Aluminium Alloy.

no substantial deterioration, on account of the formation of protective films. Thus in the construction of various types of laboratory equipment the use of aluminium is effective in avoiding frequent renewals and heavy depreciation.

Steel, of course, is much cheaper than either copper or aluminium, but the non-ferrous metals have the advantage that their scrap value is a substantial proportion of their initial value, and the initial high cost of plant constructed of these materials is to some extent compensated by the scrap value of the plant after it has come to the end of useful life. Another feature of aluminium which is of importance in certain of its applications is the excellent appearance of the metal and the facility with which it can be polished. Polished aluminium is equal in appearance to a plated finish, and can be kept bright with little trouble. In many applications the greater heat conductivity of aluminium is also highly important. Heat is transmitted through aluminium at a rate which is from four to five times as rapid as through an equal thickness or iron or steel, so that for boilers and ovens the use of aluminium will conserve gas consumption.

The gas industry now supplies a large number of gas-fired furnaces which are used for such purposes as heat-treatment of metals, heating before stamping, and so on. In many cases it is common practice to make the main external castings and casing of aluminium or aluminium alloy. Not only does this give a light, amply strong rustless structure, but in addition the low heat emissivity of polished metal gives more efficient working. Where sheet aluminium cannot be used, the finishing of the furnace with aluminium paint will give high reflectivity and a minimum of heat loss. This adoption has been very considerably extended recently, and soldering stove hoods are also often produced in the light metal.

Re-inforced "Dexonite"

DEXONITE, manufactured solely by Dexine Ltd., is a specially improved hard rubber product which is particularly suitable for a large number of applications in the chemical industries. For instance, it is employed with conspicuous success as a lining material for chemical plant on account of the good adhesion which is obtained. Chemical engineers can rely on a sound job when tanks, pipes, process vessels, etc., are lined with Dexonite, and when agitators, rollers, dip-sticks, etc., are covered with this material. Various grades are manufactured to suit the variety of service conditions for which it is used. It can be employed successfully in contact with hydrochloric acid, sulphurous acid and sulphite liquors, sulphuric and phosphoric acids and all organic acids; it is unaffected by concentrated solutions of caustic alkalies and by many other corrosive solutions.

In addition to its exceptional resistance to corrosion and erosion. Dexonite also withstands much higher temperatures than ordinary ebonite, without sagging. At the same time it is strong, not brittle, and can be machined and finished to a fine polish. It is, therefore, truly described as "super-ebonite." Last year the manufacturers developed a specially reinforced variety which has proved of exceptional value inasmuch as it may be suitable for conveying hot liquors. Thus, it is now possible to save the cost of metal pipes and their carriage and avoid the difficulties so often experienced when such pipes are lined with ebonite. Dexine, Ltd., also specialise in the manufacture of complete pumping units for the handling of corrosive liquors. Centrifugal and reciprocating types are successfully working in various parts of the country. Dexonite is also moulded into the smaller accessories, such as spools and bobbins, candle filters, and other articles used in the artificial silk industry.

CARBON dioxide wells of high yield have been exploited for some years past at Ralingen-on-Sauer, a German village in the vicinity of the frontier of Luxemburg. On boring to a depth of 600 feet on the Luxemburg side of the river, carbon dioxide has again been struck, while a rich find was simultaneously made on the German side at only 100 feet from the surface.

British Overseas Chemical Trade in July

Decrease in Exports

Exports of chemicals, drugs, dyes and colours during July amounted to £1,345,504, compared with £1,445,804 for the corresponding month of 1932. Imports totalled £768,336, against £749,616 during July last year; the re-exports fell back to normal proportions for the month, showing £44,375, compared with £672,793 for June, and £34,283 for July, 1932.

Imports

	Quantities. Month ended July 31. 1932.	1933.	Value. Month ended July 31. 1932. £	1933. £
Acetic Anhydride cwt.	551	732	1,524	1,893
Acid, Acetic .. tons	438	14,611	14,256	23,356
Acid, Tartaric, including Tartrates .. cwt.	2,358	4,400	9,859	16,930
Bleaching Materials ,,	3,153	4,026	3,906	4,980
Borax .. .. ,,	11,400	10,690	5,979	5,902
Calcium Carbide .. ,,	45,430	33,668	28,448	21,040
Coal Tar Products, not elsewhere specified value	—	—	2,190	19,033
Glycerine, Crude .. cwt.	100	10,191	155	14,433
Glycerine, Distilled ,,	524	601	909	1,071
Red Lead and Orange Lead cwt.	1,828	1,580	1,898	1,537
Phosphorus .. ,,	6,857	4,333	26,347	14,228
Kainite, etc. .. ,,	19,369	5,400	3,221	1,161
Potassium Nitrate (Saltpetre) .. .. cwt.	7,797	5,627	6,076	4,918
Other Potassium Compounds .. .. cwt.	267,245	111,378	133,570	65,519
Sodium Nitrate .. ,,	7	20	5	22
Other Sodium Compounds cwt.	16,643	32,565	11,617	26,891
Tartar, Cream of .. ,,	1,095	360	3,968	1,117
Zinc Oxide .. ,,	11	54	245	1,128
Other Chemical Manufactures .. .. value	—	—	165,712	184,079
Quinine and Quinine Salts oz.	10,017	64,316	1,037	4,895
Bark Cinchona (Bark Peruvian, etc.) .. cwt.	1,327	1,039	8,186	3,979
Other Drugs .. value	—	—	83,956	115,219
Intermediate Coal Tar Products used in the manufacture of Dyes cwt.	304	10	3,799	227
Alizarine and Alizarine Red .. .. cwt.	—	—	—	—
Indigo, Synthetic ,,	—	—	—	—
Other Finished Dyestuffs cwt.	2,843	3,212	64,876	69,566
Cutch .. .. ,,	973	1,701	1,032	1,845
Other Extracts for Dyeing cwt.	1,303	2,937	3,846	11,263
Indigo, Natural .. ,,	—	—	—	—
Extracts for Tanning (Solid or Liquid) .. cwt.	90,229	83,375	64,788	55,641
Barytes, Ground .. ,,	24,874	31,718	4,920	6,355
White Lead (Dry) ,,	4,703	7,375	5,891	8,917
Other painters' colours and materials .. cwt.	69,656	78,931	87,400	81,191
TOTAL .. value	—	—	749,616	768,336

Exports

Acid, Sulphuric .. cwt.	4,603	6,065	2,495	3,182
Acid, Tartaric, including Tartrates .. cwt.	856	765	3,763	3,560
Ammonium Chloride (Muriate) .. .. tons	314	250	5,189	4,893
Ammonium Sulphate ,,	50,540	21,068	230,485	123,404
Bleaching Powder (Chloride of Lime) .. cwt.	77,523	54,491	23,339	14,599
COAL TAR PRODUCTS—				
Anthracene .. cwt.	—	49	—	20
Benzol and Toluol gal.	4,840	38,603	379	5,294
Carbolic Acid (Crude) gal.	11,859	17,906	1,140	2,704
Carbolic Acid (crystals) cwt.	535	392	1,904	1,829
Cresylic Acid .. gal.	77,899	116,452	7,902	8,887
Naphtha .. ,,	3,662	11,084	268	770
Naphthalene (excluding Naphthalene Oil) cwt.	2,287	5,624	722	2,017
Tar Oil, Creosote Oil, etc. .. .. gal.	3,096,120	1,709,551	55,810	27,740
Other Sorts .. cwt.	20,654	66,951	7,375	17,043
COAL TAR PRODUCTS value	—	—	75,500	66,304
Copper, Sulphate of, etc. tons	3,525	1,652	55,476	24,363
Disinfectants, Insecticides, etc. .. .. cwt.	19,719	24,464	47,670	53,590
Glycerine, Crude .. ,,	2,079	6,673	2,030	9,250
Glycerine, Distilled ,,	9,569	29,840	20,446	56,618
Potassium Chromate and Bichromate .. cwt.	979	959	2,314	2,250
Potassium Nitrate (Saltpetre) .. .. cwt.	1,039	1,807	1,656	2,908
Potassium Compounds ,,	941	5,028	5,439	7,342
Sodium Carbonate, including Crystals, Ash and Bicarbonate .. cwt.	302,949	212,647	84,573	61,165
Caustic Soda .. ,,	168,572	109,240	103,831	75,499
Sodium Chromate and Bichromate .. cwt.	1,619	1,500	3,263	2,682
Sodium Sulphate, including Salt Cake .. cwt.	37,459	20,620	4,177	2,647
Other Sodium Compounds cwt.	43,131	72,210	57,992	94,568
Zinc Oxide .. tons	1,032	1,156	19,528	22,548
Other Chemical Manufactures, etc. .. value	—	—	193,098	269,517
Quinine and Quinine Salts oz.	221,411	96,692	23,907	10,245
Other Drugs .. value	—	—	189,698	181,633
Dyes and Dye-stuffs (Coal Tar) .. .. cwt.	10,768	9,318	103,063	82,059
Other Dye-stuffs .. ,,	9,640	21,308	9,276	18,290
Barytes, Ground .. ,,	2,098	2,066	1,159	692
White Lead (Dry) ,,	1,749	1,632	3,082	2,936
Paints and colours in paste form .. .. cwt.	18,805	15,833	31,407	27,202
Paints and Enamels prepared .. .. cwt.	26,113	28,516	77,233	85,969
Other painters' colours and materials .. cwt.	38,285	47,360	64,715	73,173
TOTAL .. value	—	—	1,445,804	1,345,504

Re-Exports

Acid, Tartaric, including Tartrates .. cwt.	25	26	155	188
Borax .. .. ,,	18	86	13	53
Coal Tar Products, not elsewhere specified value	—	—	8	13
Potassium Nitrate (Saltpetre) .. .. cwt.	23	70	38	104
Sodium Nitrate .. ,,	70	970	30	408
Tartar, Cream of .. ,,	89	148	439	556
Other Chemical Manufactures .. .. value	—	—	7,387	10,106
Quinine and Quinine Salts oz.	5,807	5,378	866	628
Bark Cinchona (Bark Peruvian, etc.) .. cwt.	284	237	2,540	1,095
Other Drugs .. value	—	—	15,142	28,322
Cutch .. .. cwt.	45	87	60	144
Other Extracts for Dyeing	45	156	501	618
Indigo, Natural .. ,,	6	1	130	12
Extracts for Tanning (Solid or Liquid) .. cwt.	604	1,079	559	784
Painters' colours and materials .. .. cwt.	279	571	595	1,278
TOTAL .. value	—	—	34,283	44,375

News from the Allied Industries

Whale Oil

THE NORWEGIAN ASSOCIATION OF WHALING COMPANIES have made an agreement limiting their production of whale oil during the 1933-34 season to 1,815,000 barrels. One Norwegian company, with an estimated capacity of 50,000 barrels, is not participating in this agreement, says the monthly report of the Norwegian Joint Stock Banks. Negotiations with the British companies are now taking place. Adding the estimated capacity of the British whaling companies to the quantities mentioned above, the total production during the coming season should amount to approximately 2,640,000 barrels, against 2,500,000 barrels during the 1932-33 season. The Norwegian whaling companies are endeavouring to form a sales organisation on the same lines as last year.

Iron and Steel

OWING TO THE IMPROVEMENT in the trade, Walter Scott, Ltd., the Leeds steel manufacturers, have decided to relight a blast furnace. They find the general demand is improving, and prospects for the autumn trade much better. An official attributed the improvement to the Government's tariff policy.

ACCORDING TO A STATEMENT concerning the Dorman Long and Co. merger, issued by the accountants, the figures of voting of the 5½ per cent. debenture holders show that out of the total debenture holdings of £5,135,944, votes for £2,902,811 were recorded. Holders of £707,313 voted against the scheme, and the necessary majority in value was obtained by £18,390. These figures are subject to a scrutiny demanded by debenture holders at the meeting.

Artificial Silk

IN A CIRCULAR TO SHAREHOLDERS the directors of Branston Artificial Silk Co. call attention to the fact that the Alliance Assurance Co., which holds a charge on the company's freehold properties and on the holding in Kirklees, Ltd., to secure £50,000 and interest thereon at 6 per cent. per annum, have accepted an offer for the properties, plant, and machinery from Courtaulds, Ltd., at £125,000. The Branston directors are issuing an urgent application to shareholders to subscribe for five-year interest bearing notes of £20 each, repayable at £22 10s. per £20 note on December 31, 1938, and carrying interest at 5 per cent. per annum in order to save the properties. If the invitation does not produce a sufficient amount to pay off the principal and interest due to the Alliance Assurance Co. all moneys will be returned.

A DISUSED SPINNING MILL in Deane Road, Bolton, is being fitted with new electrically driven machinery for the production or artificial silk. The mill has been taken over by a subsidiary company, formed by Kirklees, Ltd., of Tottington, and Greenhalgh and Shaw, Ltd., of Bolton, both of which have been producing rayon yarns for some time.

Paint and Varnish

WHATEVER MAY BE THE OBJECTIONS of those who cry out for the preservation of obsolete quarters of the town, little opposition can be raised against the rebuilding of 4 Carlton Gardens by those who have seen it. It is the new administrative centre of Pinchin, Johnson & Co., and will be in full working order on August 21. The new building will combine under one roof all the departments and associated companies which have hitherto been scattered in premises in different parts of London, and a special arrangement of departments will enable all callers to be interviewed on the ground floor. Other unusual features are the padding of certain rooms for the deadening of sound, the system of air circulation which ensures a continual supply of fresh air, heated in winter, and the arrangements throughout the building making for ease of communication with other departments and speedy reference to ledgers and files in the various departments themselves. One room on the ground floor has been pannelled in bakelite, coloured to harmonise with the surrounding scheme of decoration, and almost indistinguishable from it. The appointment of rooms throughout the building can be singled out for comfort combined with labour-saving devices which avoid quackery, and the offices are appropriate headquarters for a firm which is the largest paint manufacturing concern in Europe and has interests all over the world.

Dye Products

AT AN EXTRAORDINARY MEETING of British Tintex and Dye Products, Ltd., on Wednesday, the scheme providing for the voluntary liquidation of the company and its reconstruction as Tintex Dyes, Ltd., was unanimously approved. Each existing shareholder has the right to take up one share of 2s. credited with 1s. 6d. paid, in the new company in exchange for each fully paid share in the old company.

Safety Glass

AS WAS GENERALLY EXPECTED, the directors of the Triplex Safety Glass Co. have decided to pay an increased dividend for the year ended June 30 last. A distribution of 2s. 6d. per share was announced to-day, which compares with 2s. per share paid a year ago. Since then, however, the issued capital has been reduced from £400,000 to £200,000 by the return to shareholders of 10s. per share. The actual rate of distribution, therefore, is 25 per cent. against only 10 per cent. paid for 1931-32. This is a very satisfactory increase, although the market professed to be a little disappointed with the statement and marked down the shares accordingly. As this dividend will absorb a net sum of £36,000, it is obvious that the accounts, which will be issued later in the month, will show a substantial expansion of profits. For the previous year the net total amounted to £30,836.

China Clay

ALTHOUGH THE SHIPMENTS at Fowey for July month were over 11,000 tons less than the previous month there is only a total decline in the general tonnage of 7,000 tons. The volume of trade done in the three sections, however, was very satisfactory aggregating 58.186 tons, compared with a total of 65.193 tons in June. The principal shipments made are as follows:—Fowey, 30,674 tons of china clay compared with 40.952 tons in June, 1,778 tons china stone and 1,859 tons of ball clay, an aggregate of 34,311 against 45,454 tons recorded in the previous month. The local port of Par had a record month of shipping largely through its accessibility to motor transport. This port shipped 10,392 tons of clay and 514 tons of china stone. Charlestown Port maintained its activity, with 5,966 tons of china clay and 1,504 tons of china stone. Penzance, 353 tons of china clay. Looe, 215 tons of china clay, whilst the despatches made entirely by rail, which were 4,890 tons, shows little or no fluctuation. Notwithstanding the shrinkage compared with the previous month the returns there is prevailing throughout the industry a decided confidence in the ultimate improvement of the trade.

Licensing of Machinery

A Revised Schedule

THE Import Duties Advisory Committee have recommended and the Treasury have approved the revision in certain respects of the classes or descriptions of machinery to which Section 10 of the Finance Act, 1932, applies. It will be appreciated that the effect of listing a class of machinery under the section is not to free machinery of that class generally from import duty. Licences are only issued in respect of particular consignments, where it is found that the requirements of the section concerning non-procurability in this country, etc., are satisfied. It should be added that the Committee are unable to entertain applications received by them after the consignment has been imported, or where duty has been paid outright.

The revised list includes the following:—Battery making machinery; glass making and working machinery; chemical, soap making and mixing machinery; paper and board making and finishing machinery; machinery for sterilising and food preparation; matchmaking machinery and deep oil well machinery.

Application may be made by or on behalf of a firm purchasing machinery for their own use, or by an importer having the sole agency for the sale of a particular machine in this country. The appropriate forms of application may be obtained on request in writing from the Secretary, Import Duties Advisory Committee, Caxton House (West Block,) Tothill Street, Westminster, S.W.1.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

THE following market report is based on information supplied by the British manufacturers concerned, and unless otherwise qualified the figures quoted apply to fair quantities, net and naked at makers' works. Where no locality is indicated, the prices are general for the United Kingdom. Particulars of the London chemical market are specially supplied to THE CHEMICAL AGE by R. W. Greeff and Co., Ltd., and Chas. Page and Co., Ltd., and those of the Scottish chemical market by Chas. Tennant and Co., Ltd.

ON the London market prices remain firm, and the improved demand continues. Although still largely under the influence of holiday conditions, the Manchester market has been a little more animated during the past week than it was a week ago. There is still, however, no general disposition to enter into fresh contracts, and sellers state that most of the business is for near delivery. Prices maintain steady in virtually every department, and only occasionally is there any indication of easiness. In the Scottish market business shows considerable improvement over the same period of last year.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 80%, £38 5s. to £40 5s.; pure 80% £39 5s.; tech., 40%, £20 5s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. LONDON: Tech., 80%, £38 5s. to £40 5s.; pure 80%, £39 5s. to £41 5s.; tech., 40%, £20 5s. to £22 5s.; tech., 60%, £29 5s. to £31 5s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £39 5s.; tech. 80%, £38 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—SCOTLAND: Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s.; B.P. powder, £36 10s. in 1-cwt. bags d/d free Great Britain in 1-ton lots upwards.

ACID CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—LONDON: 9½d. per lb.; less 5%. MANCHESTER: 9½d. to 9¾d.

ACID, CRESYLIC.—97/99%, 1s. 1d. to 1s. 7d. per gal.; 98/100%, 1s. 5d. to 2s.

ACID, FORMIC.—LONDON: £47 10s. per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £48; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £53; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 7s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £49 to £52 ex store. MANCHESTER: £48 to £54 ex store.

ACID, SULPHURIC.—Average prices f.o.r. British makers' works, with slight variations owing to local considerations; 140° Tw. crude acid, £3 per ton; 168° Tw. arsenical £5 10s.; 168° Tw. non-arsenical, £6 15s. SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—LONDON: 11d. per lb. SCOTLAND: B.P. crystals, 11d., carriage paid. MANCHESTER: 11¾d.

ALUM.—SCOTLAND: Lump potash, £9 per ton ex store.

ALUMINA SULPHATE.—LONDON. £8 5s. to £9 10s. per ton. SCOTLAND: £8 to £8 10s. ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £32 per ton; powdered, £34, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £19 to £20. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

ANTIMONY OXIDE.—SCOTLAND: Spot, £26 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC.—LONDON: £19 c.i.f. main U.K. ports for imported material; Cornish nominal, £23 f.o.r mines. SCOTLAND: White powdered. £23 ex wharf. MANCHESTER: White powdered Cornish, £22 10s. at mines.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—£11 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot 35/37% £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 15s. in 5/6 cwt. casks.

BORAX, COMMERCIAL.—Granulated, £15 10s. per ton; powder, £17 packed in 1-cwt. bags. carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—2s. 9d. to 3s. 1d.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—3¼d. to 4¾d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£41 to £46 per ton, drums extra.

CHROMIUM OXIDE.—10½d. per lb., according to quantity d/d U.K. Green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 3½d. per lb. Liquor, £19 10s. per ton d/d.

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—LONDON: £4 per cwt.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £28 per ton. SCOTLAND: 40%, £28 ex store.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £34 per ton; brown, £1 per ton less. SCOTLAND: White crystals, £33 to £35; brown, £1 per ton less. MANCHESTER: White, £32 10s.; brown, £31.

LEAD NITRATE.—£28 per ton.

LEAD, RED.—SCOTLAND: £25 10s. to £28 per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid.

LITHOPONE.—30%, £17 10s. to £18 per ton.

MAGNESITE.—SCOTLAND: Ground Calcined £9 per ton ex store.

METHYLATED SPIRIT.—61 O.P. Industrial 1s. 8d. to 2s. 3d. per gal. Pyridinised Industrial, 1s. 10d. to 2s. 5d. Mineralised, 2s. 9d. to 3s. 3d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NICKEL AMMONIUM SULPHATE.—£49 per ton d/d.

NICKEL SULPHATE.—£49 per ton d/d.

PHENOL.—9d. to 10d. per lb. nominal.

POTASH, CAUSTIC.—LONDON: £42; MANCHESTER: £41.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5¾d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100% powder, £37. MANCHESTER: £38.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND: Refined Granulated £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8½d. per lb. SCOTLAND: B.P. crystals, 8½d. MANCHESTER: Commercial, 8¼d. B.P., 8½d.

POTASSIUM PRUSSIATE.—LONDON: 8½d. to 8¾d. per lb. SCOTLAND: Yellow spot material, 8¼d. ex store. MANCHESTER: Yellow, 8¾d.

SALAMMONIAC.—First lump spot, £42 17s. 6d. per ton d/d in barrels.

SODA ASH.—58% spot, £5 17s. 6d. per ton f.o.r. in bags, special terms for contracts.

SODA, CAUSTIC.—Solid 76/77° spot, £14 5s. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 15s. in casks, Solid 76/77%, £14 10s. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 10s. contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£22 per ton. LONDON: £23.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 10s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous, 5d. per lb. LONDON: 4d. per lb. with discounts for quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts. MANCHESTER: 4d. less 1 to 3½% contracts, 4d. spot lots.

SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d 1-cwt. iron drums for home trade.

SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£32 per ton.

SODIUM CHROMATE.—3¾d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £15 ex station, 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.

SODIUM NITRITE.—LONDON: Spot, £18 to £20 per ton d/d station in drums.
SODIUM PERBORATE.—LONDON: 10d. per lb.
SODIUM PHOSPHATE.—£12 10s. per ton.
SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 4¾d. to 5¾d.
SODIUM SILICATE.—140° Tw. Spot £8 5s. per ton d/d station, returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND: English material £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground Spot, £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 5s.
SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8.
SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot, £9 10s. d/d station in bags.
SULPHATE OF COPPER.—MANCHESTER: £17 per ton f.o.b.
SULPHUR.—£11 10s. per ton. SCOTLAND: Flowers, £11; roll, £10 10s.; rock, £9; ground American, £10 ex store.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.
SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.
VERMILION.—Pale or deep, 4s. 3d. to 4s. 5d. per lb.
ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.
ZINC SULPHATE.—LONDON AND SCOTLAND: £12 per ton.
ZINC SULPHIDE.—11d. to 1s. per lb.

Pharmaceutical and Fine Chemicals

CADMIUM IODIDE.—14s. 6d. per lb.
IRON AMMON. CITRATE.—B.P., 1s. 9d. per lb.; green, 2s. 5d. per lb.
IRON QUININE CITRATE.—9¾d. to 1s. 0½d. per oz.
LINALOL (ex Shui oil).—5s. 9d. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 7s. 6d. per lb.; ex Shui oil, 6s. 6d.
MENTHOL.—A.B.R. recryst., B.P., 15s. per lb.; synthetic detached crystals, 8s. 6d. to 10s. 6d. per lb.
PHENACETIN.—4s. to 4s. 6d. per lb.

Intermediates and Dyes

In the following list of intermediates delivered prices include packages except where otherwise stated:—
ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100% d/d buyer's works.
ACID, SULPHANILIC.—Spot, 8d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.
BENZIDINE BASE.—Spot, 2s. 5d. per lb. 100% d/d buyer's works.
p-CRESOL 34-5° C.—1s. 9d. per lb. in ton lots.
m-CRESOL 98/100%.—2s. 3d. per lb. in ton lots.
DICHLORANILINE.—2s. 3d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—8d. per lb.
DINITROTOLUENE.—48/50° C., 8d. per lb.; 66/68° C. 8¾d. per lb.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
β-NAPHTHOL.—Spot, £78 15s. per ton in paper bags; £79 15s. in casks, in 1-ton lots.
α-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.
β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
o-NITRANILINE.—5s. 10d. per lb.
m-NITRANILINE.—Spot, 2s. 7d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 4½d. per lb.; 5-cwt. lots, drums extra.
NITRONAPHTHALENE.—9d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.
o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.
p-TOLUIDINE.—Spot, 1s. 11d. per lb., d/d buyer's works.
m-XYLIDINE ACETATE.—3s. 4d. per lb.

Coal Tar Products

ACID, CARBOLIC.—Crystals, 9d. to 10d. per lb.; crude, 60's, 2s. 5d. to 2s. 6d. per gal.; 2% water 3s. 0¾d. MANCHESTER: Crystals, 9d. to 9½d. per lb.; crude, 2s. 7d. per gal. SCOTLAND: 60's, 1s. 7d. to 1s. 8d.
ACID, CRESYLIC.—99/100%, 11d. to 1s. 8d. per gal.; pale, 98%, 1s. 4d. to 1s. 5d.; pale 95%, 11d. to 11½d.; dark, 10d., all according to specification; refined, 1s. 8d. to 1s. 9d. LONDON: 98/100%, 1s. 3d.; dark, 95/97%, 11d. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; 97/99%, 1s. to 1s. 1d.; dark, 97/99%, 11d. to 1s.; high boiling acid, 2s. 6d. to 3s.
ANTHRACENE OIL.—Strained, 4½d. per gal.
BENZOL.—At works, crude, 9d. to 9½d. per gal.; standard motor 1s. 4d. to 1s. 4½d.; 90%, 1s. 5d. to 1s. 6d.; pure, 1s. 7½d. to 1s. 8d. LONDON: Motor, 1s. 6½d. SCOTLAND: Motor, 1s. 6½d. to 1s. 7½d.; 90%, 2s. 0½d. to 2s. 1½d.
CREOSOTE.—B.S.I. Specification standard, 3d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 3d. to 3½d. f.o.r. North; 4d. to 4½d. London. MANCHESTER: 2½d. to 3¾d. SCOTLAND: Specification oils, 3½d. to 4d.; washed oil, 3½d. to 4d.; light, 3d. to 3½d.; heavy, 4½d. to 5d.
NAPHTHA.—Solvent, 90/160%, 1s. 4d. to 1s. 5d. per gal.; 95/160%, 1s. 7d.; 90/190%, 9d. to 1s. 1d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.
NAPHTHALENE.—Crude, Hot-Pressed, £6 1s. 3d. per ton. Flaked, £10 per ton. Purified crystals, £9 10s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.
PITCH.—Medium soft, £4 per ton. MANCHESTER: £4 f.o.b. LONDON: £3 15s. f.o.b. East Coast port for next season's shipment.
PYRIDINE.—90/140, 4s. to 4s. 6d. per gal.; 90/180, 2s. to 2s. 6d. SCOTLAND: 90/160% 4s. to 5s.; 90/220%, 3s. to 4s.
REFINED COAL TAR.—SCOTLAND: 4d. per gal.
TOLUOL.—90%, 2s. 2d. to 2s. 3d.
XYLOL.—Commercial, 2s. to 2s. 1d. per gal.; pure, 2s. 3d. to 2s. 4d.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 15s. to £9 per ton. Grey £14 to £16. Liquor, brown, 30° Tw., 6d. per gal. MANCHESTER: Brown, £9 10s.; grey, £16.
ACETIC ACID, TECHNICAL, 40%.—£17 to £18 per ton.
AMYL ACETATE, TECHNICAL.—95s. to 110s. per cwt.
CHARCOAL.—£6 to £11 per ton.
WOOD CREOSOTE.—6d. to 2s. per gal., unrefined.
WOOD NAPHTHA, MISCIBLE.—3s. to 4s. per gal. Solvent, 3s. 9d. to 4s. 9d. per gal.
WOOD TAR.—£2 10s. to £6 per ton.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—The price for neutral quality, basis 20.6 per cent. nitrogen for delivery to farmer's nearest station carriage paid in 6 ton lots is announced as follows:—September, £6 15s. per ton; October, £6 15s. per ton; November, £6 17s. 6d. per ton; December, £7 per ton; January, £7 2s. 6d. per ton; February/June, £7 5s. per ton.
NITRO-CHALK.—The price of this product, basis 15.5 per cent. nitrogen, for delivery up to June, 1934, in 6 ton lots, carriage paid to farmer's nearest station is unchanged at £7 5s. per ton.
BRITISH NITRATE OF SODA.—The price for this product, basis 16 per cent. nitrogen, for delivery up to June, 1934, in 6 ton lots carriage paid to farmer's nearest station is £7 5s. per ton.
The export price for Sulphate of Ammonia continues steady at £6 6s. 3d. per ton for August shipment f.o.b. U.K. ports in single bags.
CYANAMIDE.—The August price is £7 per ton, carriage paid to any railway station in Great Britain, in lots of 4 tons and over.
CHILEAN NITRATE OF SODA.—Prices have been announced as follows for delivery in 6 ton lots, carriage paid to buyer's station, gross for net:—July/October, £7 8s. 6d. per ton; November, £7 11s. 3d. per ton; December, £7 14s. per ton; January, £7 16s. 9d. per ton; February/June, £7 19s. 6d. per ton.
CONCENTRATED COMPLETE FERTILISERS.—The prices of these products for August delivery range from £10 9s. 6d. to £11 per ton, according to percentage of constituents.

Latest Oil Prices

LONDON, August 16.—LINSEED OIL was unchanged. Spot, small quantities, £23 10s.; Aug. £20 16s.; Sept.-Dec., £20 12s. 6d.; Jan.-April, £21 5s., naked. RAPE OIL was quiet. Crude extracted, £28 10s.; technical refined, £30, naked, ex wharf. COTTON OIL was slow. Egyptian crude, £21; refined common edible, £24; deodorised, £26, naked, ex mill. TURPENTINE was 6d. down. American, spot, 49s. 3d. per cwt.
HULL.—LINSEED OIL.—Spot, quoted £21 2s. 6d. per ton; Aug., £20 12s. 6d.; Sept.-Dec., £20 15s.; Jan.-April, £21 7s. 6d. COTTON OIL, Egyptian crude, spot, £21; edible, refined, spot, £23 10s.; technical, spot, £23 10s.; deodorized, £25 10s., naked. PALM KERNEL OIL, crude, f.m.q., spot, £17, naked. GROUNDNUT OIL, extracted, spot, £23 10s.; deodorized, £27 10s. RAPE OIL, extracted, spot, £27 10s.; refined, £29. SOYA OIL, extracted, spot, £21; deodorized, £24. COD OIL, 21s. per cwt., nominal. CASTOR OIL, pharmaceutical, spot, 38s.; first, 33s.; second, 30s. per cwt. TURPENTINE, American, spot, 51s. 9d. per cwt.

Inventions in the Chemical Industry

Specifications Accepted and Applications for Patents

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Accepted with Dates of Application

PROCESS FOR THE MANUFACTURE OF CONVERSION PRODUCTS OF RUBBER AND OF CHLORINATED AND BROMINATED PRODUCTS THEREOF. F. S. Shadbolt. March 16, 1932. 396,154.

PROCESS FOR THE MANUFACTURE OF READILY SOLUBLE BASIC DYESTUFFS.—I. G. Farbenindustrie. June 6, 1931. 396,177.

MANUFACTURE OF MIXED POLYMERISATION PRODUCTS.—W. W. Groves (I. G. Farbenindustrie). May 7, 1932. 396,186.

MANUFACTURE OF DYES AND INTERMEDIATE PRODUCTIONS THEREFOR, AND OF SENSITISED PHOTOGRAPHIC EMULSIONS.—I. G. Farbenindustrie. July 11, 1931. 396,217.

INSECTICIDAL, WOOD-PRESERVING, DISINFECTANT, AND THE LIKE COMPOSITIONS.—E. I. Du Pont de Nemours and Co. Oct. 16, 1930. 396,064.

DERIVATIVES OF 2-HYDROXY-DIPHENYL.—C. Arnold. (Dow Chemical Co.). Oct. 27, 1932. 396,251.

PROCESS OF, AND APPARATUS FOR, THE PRODUCTION OF BLEACHING POWDER.—I. G. Farbenindustrie. Nov. 2, 1931. 396,256.

REDUCTION OF FATS, OILS, WAXES, FATTY ACIDS, AND THE LIKE.—Deutsche Hydrierwerke Akt.-Ges. Feb. 22, 1932. 396,311.

ESTERS OF FATTY AROMATIC ACIDS WITH AMINOALCOHOLS, AND PROCESS FOR OBTAINING THE SAME.—F. Hoffman-La Roche and Co. Akt.-Ges. March 22, 1932. 396,318.

MANUFACTURE OF ARYLAMINO-1-HYDROXYNAPHTHALENE-CARBOXYLIC ACIDS.—W. W. Groves. Feb. 27, 1932. 396,320.

HYDRATION OF OLEFINES.—H. Dreyfus. Dec. 22, 1931. 396,107.

MANUFACTURE OF A PEROXIDE FROM TETRAHYDRONAPHTHALENE.—Soc. of Chemical Industry in Basle. April 29, 1932. 396,351.

MANUFACTURE OF AZO DYESTUFFS AND THE COLOURATION OF TEXTILE MATERIALS.—British Celanese, Ltd., G. H. Ellis, and E. W. Kirk. Oct. 26, 1931. 396,412.

DISPERSIONS OF COAL IN OIL.—Cunard Steamship Co., Ltd., R. A. Adam, F. C. V. Holmes, and A. W. Perrins. Nov. 2, 1931. 396,432.

SYNTHESIS OF FORMIC ACID.—H. Dreyfus. Dec. 1, 1931. 396,375.

MANUFACTURE OF WATER-SOLUBLE PYRIDINE DERIVATIVES FOR USE AS CONTRAST MEDIA IN X-RAY PHOTOGRAPHY.—I. G. Farbenindustrie. Dec. 20, 1930. 396,414.

PROCESS FOR TREATING COBALT-TUNGSTEN ALLOYS.—Vereinigte Stahlwerke Akt.-Ges. Feb. 18, 1931. 396,380.

INDOPHENOLS AND SULPHUR DYES THEREFROM.—Imperial Chemical Industries, Ltd., and M. Wyler. Feb. 1, 1932. 396,393.

TREATMENT OF CAUSTIC SODA SOLUTIONS FOR THE REMOVAL OF SULPHATE THEREFROM.—H. M. Broadhurst, and Imperial Chemical Industries, Ltd. Feb. 10, 1932. 396,456.

PRODUCTION OF HEXAMETHYLENETETRAMINE.—H. O. Dering, and M. D. Kelly. Feb. 22, 1932. 396,467.

MANUFACTURE OF RACEMIC COMPOUNDS OF THE 1-HYDROXYPHENYL-2-AMINOPROPANOL(1) SERIES.—W. W. Groves. July 25, 1931. 396,551.

PROCESS OF, AND APPARATUS FOR, THE PRODUCTION OF KETENS BY PYROLYSIS.—Standard Oil Development Co. Oct. 17, 1931. 396,568.

PREPARATION OF A TYPE OF FIBROUS CELLULOSE ESTER.—C. F. Boehringer & Soehne Ges. Oct. 5, 1931. 396,575.

PRODUCTION OF METHYLATED CYCLO-HEPTANONES AND CYCLO-OCTANONES.—Soc. Anon. M. Naef et Cie. Oct. 30, 1931. 396,576.

PREPARATION OF HORMONES.—Schering-Kahlbaum Akt.-Ges. Oct. 23, 1931. 396,581.

MANUFACTURE OF ISATINS AND INDIGOID DYESTUFFS DERIVED THEREFROM.—I. G. Farbenindustrie. Nov. 26, 1932. 396,636.

CASTING OF READILY OXIDIZABLE METALS.—Dow Chemical Co. March 3, 1932. 396,645.

MANUFACTURE OF ALKALI METAL SALTS OF ADENYL-PYROPHOSPHORIC ACIDS.—I. G. Farbenindustrie. Feb. 27, 1932. 396,647.

PROCESS FOR THE MANUFACTURE OF CELLULOSE ESTERS.—C. F. Boehringer & Soehne Ges. March 19, 1932. 396,657.

MANUFACTURE OF 3-METHYLAL-3-OXYMETHYL-*n*-PENTANE.—Dr. A. Wacker Ges. Für Elektrochemische Industrie Ges. April 13, 1932. 396,658.

MANUFACTURE OF 1-METHYLAMINO-4-AMINO-ANTHRAQUINONE.—Soc. of Chemical Industry in Basle. April 2, 1932. 396,662.

DEVICE FOR INDICATING THE PRESENCE OF A CHEMICAL SUBSTANCE BY COLOUR CHANGE.—F. O. Barralet, and C. E. Richards. May 29, 1933. 396,672.

PRODUCTION AND EMPLOYMENT OF ORGANIC PERSULPHO COMPOUNDS.—Flesch-Werke Akt.-Ges. Für Gerbstoff-Fabrikation U Chemische Produkte. Nov. 27, 1931.

COLOURING TEXTILE MATERIALS.—British Celanese, Ltd., G. H. Ellis, and E. W. Kirk. Oct. 26, 1931. 396,429.

DYEING TEXTILE MATERIALS.—British Celanese, Ltd., E. W. Kirk, and G. H. Ellis. Oct. 26, 1931. 396,430.

Applications for Patents

PRODUCTION OF REGENERATED CELLULOSE IN SHEET FORM.—W. Pownall and E. L. Silverstone. July 29. 21351.

POURERS FOR FINISHING MACHINES FOR PRODUCING FILMS OF REGENERATED CELLULOSE.—W. Pownall and E. L. Silverstone. Julye 29. 21352.

MANUFACTURE OF FIBRE WEBS OR SHEETS CONTAINING RESINS.—Soc. of Chemical Industry in Basle. July 25. (Switzerland, July 27, '32.) 20962.

MAKING SODIUM ETHYL OXALACETATE, ETC.—U.S. Industrial Co. July 26. 21057.

ELECTROCHEMICAL DEPOSITION OF NICKEL ON ALUMINIUM, ETC.—J. W. Whitaker. July 24. 20776.

FILTERING AND WASHING MIXTURES OF SOLID AND LIQUID MATERIALS.—Aktiebolaget Kemiska Patenter. July 31. (Germany, Sept. 6, '32.) 21486.

SULPHONATION OF ALCOHOLS.—T. W. Barber. Aug. 3. 21798.

LIQUID FUELS.—J. F. T. Berliner, E. I. Du Pont De Nemours & Co., and R. W. Plummer. Aug. 3. 21846.

PRODUCTION OF ALUMINIUM FLUORIDE.—British Aluminium Co., Ltd., G. B. Brook, and A. C. Coates. Aug. 5. 22088.

MANUFACTURE OF DERIVATIVES OF UNSATURATED ACIDS.—R. Burns, Imperial Chemical Industries, Ltd., D. T. Jones, and P. D. Ritchie. Aug. 3. 21845.

MANUFACTURE OF NITROGENOUS CONDENSATION PRODUCTS.—A. Carpmael (I. G. Farbenindustrie). Aug. 2. 21742.

MANUFACTURE OF QUARTERNARY AMMONIUM COMPOUNDS.—A. Carpmael (I. G. Farbenindustrie). Aug. 2. 21743.

MANUFACTURE OF SODIUM CARBONATE DECAHYDRATE.—H. E. Cocksedge. July 31. 21526.

MANUFACTURE OF COLOURED CELLULOSE MATERIAL.—H. Dosne. Aug. 4. (Germany, Aug. 19, '32.) 21947, 21948, and 21949.

MANUFACTURE OF ORGANIC SULPHIDES, ETC.—Dunlop Rubber Co., Ltd., and A. E. T. Neale. Aug. 1. 21580.

DYESTUFF INTERMEDIATES OF THE ANTHRAQUINONE SERIES, ETC.—E. I. Du Pont De Nemours & Co. Aug. 1. (United States, Aug. 1, '32. 21643.

DYESTUFFS OF THE ANTHRAQUINONE SERIES.—E. I. Du Pont De Nemours & Co. Aug. 1. (United States, Aug. 1, '32.) 21644.

MANUFACTURE OF HALOGENATED ETHERS.—E. I. Du Pont De Nemours & Co. Aug. 4. (United States, Aug. 4, '32.) 21958.

Complete Specifications Open to Public Inspection

PROCESS FOR THE PRODUCTION OF POTASSIUM NITRATE.—Kali-Forschungs-Anstalt Ges. Jan. 28, 1932. 29480/32.

PROCESSES OF POLYMERISING VINYL COMPOUNDS.—Carbide and Carbon Chemicals Corporation. Jan. 29, 1932. 163/33.

PROCESS FOR THE PRODUCTION OF MONOBASIC ALUMINIUM SULPHITE.—T. Goldschmidt Akt.-Ges. Jan. 25, 1932. 1924-5/33.

MANUFACTURE OF SUBSTANTIVE DYESTUFFS.—Deutsche Hydrierwerke Akt.-Ges. Jan. 29, 1932. 2195/33.

MANUFACTURE OF EASILY SOLUBLE ESTER-SALTS OF LEUCO-VAT-DYESTUFFS.—Durand and Huguenin Akt.-Ges. Jan. 25, 1932. 2299/33.

MANUFACTURE OF UQINOLINE DERIVATIVES.—I. G. Farbenindustrie. Jan. 26, 1932. 2525-6/33.

PROCESS FOR OBTAINING SULPHUR FROM SPENT GAS PURIFICATION MASSES.—H. Deneke. Jan. 26, 1932. 2579/33.

MANUFACTURE OF BARIUM FLUOSILICATE AND ITS APPLICATION.—Grasselli Chemical Co. Jan. 29, 1932. 2747/33.

PROCESS FOR THE PRODUCTION OF SODIUM NITRATE AND CALCIUM CHLORIDE.—Norsk Hydro-Elektrisk Kvaelstofaktieselskab. Feb. 4, 1932. 16242/32.

METHOD OF PRECIPITATING ZIRCONIUM AND/OR HAFNIUM ON A CORE CONSISTING OF A HIGHLY REFRACTORY MATERIAL.—Naamlooze Vennootschap Philips' Gloeilampenfabrieken. Feb. 3, 1932. 1556/33.

PROCESS FOR SEPARATING DI-ACETYLENE FROM GASES CONTAINING ACETYLENE.—Ruhrchemie Akt.-Ges. Feb. 5, 1932. 1580/33.

PROCESS OF, AND APPARATUS FOR, MAKING KETENE.—Carbide & Carbon Chemicals Corporation. Feb. 5, 1932. 1970/32.

MANUFACTURE OF AROMATIC AMINO BASES.—Soc. of Chemical Industry in Basle. Feb. 3, 1932. 2995/33.

PRODUCTION OF RESINOUS CONDENSATION PRODUCTS.—International General Electric Co., Ltd. Feb. 3, 1932. 3234/33.

PROCESS FOR THE MANUFACTURE OF DYESTUFFS OF THE AZINE SERIES.—I. G. Farbenindustrie. Feb. 3, 1932. 3251/33.

MANUFACTURE OF DERIVATIVES OF 1-NITRO ANTHRAQUINONE-6-CARBOXYLIC ACID.—E. I. Du Pont De Nemours & Co. Feb. 3, 1932. 3425/33.

From Week to Week

THE COUNCIL OF THE MINING INSTITUTE OF SCOTLAND have decided to postpone the general meeting which was to have been held in the Royal Technical College, Glasgow, during August.

WE ARE ASKED TO STATE that a fire at the premises of Tuck and Co., Ltd., reported by a certain newspaper to have destroyed the entire building, only affected part of it. Tuck and Co. are manufacturers of packing, asbestos and rubber goods, etc., and their factory is at Lambeth, London, S.E.11.

THE CANADIAN COMMERCIAL INTELLIGENCE JOURNAL announces that imports of chemical and allied products during June amounted to £2,143,986, of which more than half came from the United States and £498,859 from the United Kingdom; exports for the same month amounted to £1,257,348, the United Kingdom taking £292,558.

LORD CASTLE STEWART, who is a director of the London board of the Lautaro Nitrate Co., Ltd., and the Mining Trust, Ltd., has resigned from Parliament owing to ill-health. He successfully contested the Harborough division in 1929, and was re-elected at the 1931 election.

DR. E. N. DODD, a student in the chemical department of the University College of the South-West, Exeter, who has been appointed to the staff of the Mersey Laboratory of H.M. Department of Scientific and Industrial Research, will be engaged largely in sampling and analysing Liverpool's water, sewage and trade wastes.

CROYDON MOULDRITE, LTD., Aldwych House, Aldwych, W.C.2, announce that arrangements have been completed between themselves and Imperial Chemical Industries, Ltd., whereby the resources, experience and services of both organisations in the moulding powder and similar fields are now available to the plastics and allied trades through Croydon Mouldrite, Ltd.

CENTRAL FARMERS, LTD., have accepted tenders for the erection of manure manufacturing plant at Methil, Fife, to the plans of Blyth and Blyth, Edinburgh. The works, which are to cost £4,000 will include a raw material shed for compounding fertilisers and another for bagging the manure, and will be the first of their kind in Scotland. The company contemplate adding a foodstuff factory later.

BOMBAY will soon have a Radium Institute from the philanthropy of some private gentleman. It was the duty of the Bombay Municipality to provide an institute of this kind but owing to lack of municipal funds the want will have to be met from public philanthropy. The non-recurring cost would be Rs. 265,000 (about £22,000) for the radium and the emanation plant, while the cost of the establishment is estimated at Rs. 15,000 (about £1,300) per annum.

THE NEWLY FORMED Association of Technologists of the River Plate aims at providing facilities for English speaking technical men to get together for the interchange of ideas relating to industry. The first meeting was held at the English Club, Buenos Aires, on June 27, when the president, Mr. L. W. Migotti, M.I.E.E., spoke on "Research and Industrial Development." He gave a general survey of research as applied to industry and this was supplemented by examples from specific industries.

THE REORGANISATION of the Overseas Trade Development Council has entailed the appointment of several new members. Lt.-Col. J. Colville, secretary of the Department of Overseas Trade, is the chairman, and now included on the Council are the following:—Sir Francis Joseph, director of the New Acid Co., Ltd., Sir William Clare Lees, managing director of the Bleachers' Association, Ltd.; Lt.-Col. R. K. Morcom, director of Belliss and Morcom, Ltd.; Mr. J. G. Nicholson, director of Imperial Chemical Industries, Ltd., and Sir Gilbert Vyle, managing director of W. and T. Avery, Ltd.

MR. S. SOLOMON, who has been works manager of Thos. Parsons and Sons, Ltd., paint manufacturers, Mitcham, for the last 20 years, has resigned his position and has been elected to the board of Lansdowne Varnish and Enamel Co., Ltd., Barnet. Mr. H. Talbot, B.Sc., M.I.Chem.E., who has been closely identified with the work of the Chemical Engineering Group of the Society of Chemical Industry since its inauguration, and has served as vice-president of the Society, was recently elected a director and appointed secretary of the company.

IT IS REPORTED FROM JOHANNESBURG that certain groups are prepared to erect a plant, probably at Vereeniging or Witbank, for the production of oil from coal, provided that the present import tax and rail rate are maintained. Dr. Van der Lingen, of the Fuel Research Institute, has stated that as South African coal has a higher ash content than English coal, the cost of erecting a plant to produce 20,000,000 gallons annually would probably amount to £7,000,000. It is intended to supply the Witwatersrand area, leaving the coastal districts open to importers.

OWING TO THE OFFICIAL RECOGNITION OF RUSSIA by the Spanish Republic, it is rumoured that an important oil deal between the two countries is being negotiated. It is suggested that the refuelling of the Spanish navy is one consideration.

THE CANADIAN INSTITUTE OF MINING AND METALLURGY publishes in the July, 1933, issue of the "Canadian Mining and Metallurgical Bulletin," a paper prepared by Mr. E. A. Collins for the annual general meeting of the Institute held at Toronto in April, and entitled "Early Days of the International Nickel Company."

THE SECRETARY FOR MINES announces that the explosive "Lodensab," manufactured by the Northern Sabulite Explosives Co., Ltd., at Tuthill Quarry, Haswell, near Sunderland, has been added to the list of permitted explosives for use in bringing down coal in mines to which Part II of the Explosives in Coal Mines Order applies.

THE INSTITUTE OF MICRO-BIOLOGY, which supersedes the College of Pestology, was incorporated yesterday. Provision is made for the establishment of fellowships, associateships, and a university chair for the study of bio-chemistry and bacteriology. The laboratory and clinics will remain at 233, Pentonville Road, N.1, for the present, but steps are being taken to find larger and more adequate premises.

WHEN THE WAREHOUSE of Brett's oil and grease works at Gateshead caught fire last week, people living nearby were driven from their homes owing to the fumes. The flames spread rapidly, being fanned by a strong wind, and were gradually approaching storage tanks containing 4,000 gallons of oil. Eventually the outbreak was controlled before any oil or petrol had been touched.

A NEW PLANT COSTING £35,000 has been erected near King's Lynn for the conversion of lucerne into meal for cattle and poultry. Two drying plants have been installed and 2,000 acres of lucerne have been grown. This enterprise is under the direction of Mr. W. Parker and Mr. R. T. Proctor of the British Crop Driers, Ltd., and is an attempt to divert the supply of lucerne meal from importers, the chief source of supply being the United States and the Argentine.

DURING THE LAST FEW WEEKS large quantities of kelp gathered along the west and north-west coasts of Ireland, have been taken to Galway Port for the production of iodine. Last week a consignment of nearly 600 tons was landed and stored in the charge of the Free State Department of Lands and Fisheries. During the month of July over 600 tons of kelp were received in Galway from one gathering organisation in County Clare. Prices for the raw material are still very low.

A START WAS MADE this week in the work of extracting petrol from coal by a plant which has been installed on Cannock Chase, at the Cannock and Leacroft Colliery. The firm have already obtained petrol from coal experimentally, and the tests to which it has been subjected have been successful. The coal distillation plant has made a start with one unit consuming 35 tons of coal a day, and the hope is entertained that in three months time, it will be possible to bring into operation another unit of similar capacity. Mr. E. W. Brocklebank is engineer in charge.

GERMAN EXPORTS OF COAL TAR DYES during the first part of 1933 have shown a sharp downward trend. During the current year shipments of aniline dyes to the Orient have shown a marked decrease, especially to British India, which took 1,905 metric tons in the first four months of 1932 and only 433 in the corresponding 1933 period. In general, exports to European markets were well maintained, some countries showing increases while export increases were also registered to Latin American countries. Shipments to Canada and the United States were appreciably contracted.

THE BUROMIN CO., OF PITTSBURGH, PA., which has made wide application of molecularly dehydrated phosphates of the alkali metals in water conditioning and washing, has founded an Industrial Fellowship at Mellon Institute for the purpose of investigating the properties of these chemicals and of extending their uses in industry, medicine and the home. Dr. Bernard H. Gilmore, who has been selected as the incumbent of this Fellowship, started his research programme on June 15. In his new post, Dr. Gilmore will ascertain and define correct procedures of employing molecularly dehydrated phosphates, particularly "Calgon." Dr. Gilmore has found that "Calgon" is of utility in cleaning various constructional materials, including stone, brick, and terra-cotta. The "Calgon" Fellowship has also evolved a formula for cleaning shrubbery and trees that has been demonstrated to be both effective and safe, and the field of uses for molecularly dehydrated phosphates in the textile and paper industries will soon be explored. It appears that these chemicals are of special value for dissolving residual calcium soaps and similar compounds as well as for water-softening purposes. It is planned to publish the results of the research as it proceeds.

New Chemical Trade Marks

Compiled from official sources by Gee and Co., Patent and Trade Mark Agents, 51-52 Chancery Lane, London, W.C.2.

Opposition to the registration of the following trade marks can be lodged up to August 26, 1933.

Odylen. 542,513. Class 2. Chemical substances used for agricultural, horticultural, veterinary, and sanitary purposes. Bayer Products, Ltd., 31 to 34 Basinghall Street, London, E.C.2. June 23, 1933.

Statoset. 541,784. Class 1. Heat resisting cements. Liptak Furnace Arches, Ltd., 38 Victoria Street, London, S.W.1. May 25, 1933. (By consent.)

Opposition to the Registration of the following Trade Marks can be lodged up to September 2, 1933.

Clensel. 541,279. Class 1. Emulsifying agents being chemical substances for the treatment of textile fibres preparatory to their use in manufacture. John Paterson & Co., Ltd., Clensel Works, Orr Street, Glasgow, S.E. May 8, 1933.

Perawin. 537,290. Class 1. Perchloric ethylene being a chemical substance for use in manufactures as a solvent. Dr. Alexander Wacker-Gesellschaft Für Elektrochemische Industrie Gesellschaft Mit Beschrankter Haftung, Prinzregentstrasse 20, Munich, Germany. December 7, 1932.

Vinoflex. 540,789. Class 1. Chemical substances used in manufactures, photography, or philosophical research, and anti-corrosives. I. G. Farbenindustrie Aktiengesellschaft, Grüneburgplatz, Frankfort-on-the-Main, 20, Germany. April 18, 1933.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Austria.—An agent established at Vienna wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of metals (copper, zinc, tin, lead, etc.); raw materials for the paper industry (clays, pyrites, etc.); gas tubes, etc. (Ref. No. 178.)

Egypt.—The Commercial Secretary to the Residency, Egypt, reports that the Egyptian Ministry of Education is inviting tenders for the supply of various drugs and medical supplies required for schools and medical inspection centres. Tenders will be received by the Central Stores, Ministry of Education, Darb-el-Gamamiz, Cairo, up to noon on September 5, 1933. For this tender local representation is essential, and the Department of Overseas Trade is prepared to furnish United Kingdom firms desirous of tendering for the supply of goods of United Kingdom manufacture, and not represented in Egypt, with the names of British merchant houses with Egyptian connections who may be willing to handle tenders on their behalf. A copy of the conditions of tender and lists of items required can be inspected at the offices of the Department (Room 52), 35 Old Queen Street, London, S.W.1, while a further copy is available for loan to firms (in order of application) who are unable to arrange for inspection in London. It should be noted, however, that the forms in the possession of the Department of Overseas Trade are specimens only, and the Department is unable to supply copies to firms who intend the actual submission of tenders. (Ref. F. 1828.)

Poland.—A firm in Warsaw wishes to represent United Kingdom manufacturers of metal powders (bronze and aluminium), imitation gold leaf dyes, on a commission basis. (Ref. No. 190.)

Company News

Eastman Kodak of New Jersey.—The regular dividend of 1½ per cent. is announced on the preferred stock and the regular dividend of $0.75 per share on the common stock.

U.S. Industrial Alcohol Co.—The net profits for the six months to June 30 last were $299,155, equal to 80 cents a share on 373,846 shares of common stock outstanding, against $32,967 for the same period in 1932, or approximately 8 cents. a share.

Clorox Chemical Co.—For the year ended June 30, the report shows a net income of $227,184, after providing for depreciation and Federal taxes, equivalent to $2.00 a share on 113,756 no-par shares of capital stock. This compares with $262,983, or $2.31 a share, in the preceding fiscal year.

South African Alkali Co.—The report for the quarter ended June 30 shows that the output of soda ash is the same as last quarter, but sales are less by 144 tons. The capital expenditure during the quarter was £220. On June 20 dividend No. 6 or 5 per cent. was declared payable.

E. I. du Pont de Nemours Co.—The net operating income for the three months ended June 30 last amounted to $6,051,495, which brings the net income for the first half of 1933 up to $8,421,065. The consolidated balance-sheet at June 30 shows floating assets $125,401,106, against current liabilities $11,474,984.

Yorkshire Dyeing and Procfing Co.—The net profit for the year to June 30 last amounted to £17,827, after providing for depreciation and tax. It is proposed to restrict the dividend for the year to 6 per cent. The directors have appropriated £10,000 to reserve and the balance carried forward is £6,074. The annual meeting will be held at Middleton, Lancashire, on August 16, at 3 p.m.

Triplex Safety Glass Co.—A dividend of 2s. 6d. per share, less tax, is recommended by the directors for the year ended June 30 last. For the previous twelve months a dividend of 10 per cent. was paid, but since then the capital has been reduced from £400,000 to £200,000 by the return to shareholders of 10s. per share, reducing the nominal value of the shares from £1 to 10s. each. The dividend now proposed, therefore, represents a distribution of 25 per cent.

SULPHURIC
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